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THE GUADALAJARA ACCORD BETWEEN BRAZIL AND ARGENTINA:

**A TENTATIVE STEP TOWARD THE NUCLEAR WEAPONS-FREE
LATIN AMERICA ENVISIONED BY THE TREATY OF TLATELOLCO**

by

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//

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In 1967, the Treaty of Tlatelolco declared Latin America to be a nuclear weapons-free zone, but this goal remains fulfilled. Argentina and Brazil, the Latin American nations most capable of building nuclear weapons, refuse to comply with the treaty. Argentine and Brazilian military leaders pursued the development of nuclear weapons from the 1970s to the late 1980s. The emergence of democratic regimes during the 1980s encouraged the gradual "nuclearization" of weapons research in these nations. In July 1991, the presidents of Argentina and Brazil signed an accord in Guadalajara, Mexico, each promising to end the development of nuclear weapons. The risks of nuclear proliferation may be reduced because of this agreement.
The Guadalajara Accord offers hope that nuclear proliferation in Latin America can be slowed and perhaps stopped. The establishment of civilian control over the military and the reduction in the belligerent rivalry between Argentina and Brazil are central factors in ending the quest for nuclear weapons. The firm commitment of these civilian leaders to pursue only peaceful nuclear activities is a positive sign. The adoption of IAEA full-scope safeguards in Argentina and Brazil will be the best guarantee for a nuclear weapons-free Latin America.

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THESIS

THE GUADALAJARA ACCORD BETWEEN BRAZIL
AND ARGENTINA:

A TENTATIVE STEP TOWARD THE NUCLEAR
WEAPONS-FREE LATIN AMERICA ENVISIONED BY
THE TREATY OF TLAHELCO

BY

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ABSTRACT

In 1967, the Treaty of Tlatelolco declared Latin America to be a nuclear weapons-free zone, but this goal remains unfulfilled. Argentina and Brazil, the Latin American nations most capable of building nuclear weapons, refuse to comply with the treaty. Argentine and Brazilian military leaders pursued the development of nuclear weapons from the 1970s to the late 1980s. The emergence of democratic regimes during the 1980s encouraged the gradual "denuclearization" of weapons research in these nations. In July 1991, the presidents of Argentina and Brazil signed an accord in Guadalajara, Mexico, each promising to abandon the development of nuclear weapons. The risks of nuclear proliferation may be reduced because of this agreement.

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I. INTRODUCTION

On 18 July 1991, President Fernando Collor de Mello of Brazil and President Carlos Menem of Argentina met in Guadalajara, Mexico to sign an accord. They agreed to abandon the development of nuclear weapons in their nations. This is the latest step in the rapprochement between two historic rivals. The agreement obligates Argentina and Brazil to "prohibit and impede" in their countries the "testing, use, or manufacture of any type of nuclear weapon." It also prohibits the storage or deployment of nuclear weapons supplied by third parties.¹ This agreement promises to be an important success in the effort to prevent the global proliferation of nuclear weapons. Argentina and Brazil have aggressively pursued nuclear weapons since the 1970s. The risks of nuclear proliferation may be reduced because of this agreement.

This thesis analyzes the efforts by Presidents Collor and Menem to end the nuclear competition between their nations. Some members of the armed forces in Argentina and Brazil oppose the Guadalajara agreement. Will this agreement overcome domestic military opposition and end the Argentine-Brazilian nuclear rivalry? Can the Guadalajara agreement complete the creation of a nuclear weapons-free continent begun by the Treaty of Tlatelolco?

¹ "No Mass Destruction Weapons," Latin American Regional Reports: Southern Cone Report (RS-91-06, 8 August 1991), 8.

The Treaty of Tlatelolco, completed in 1967, was the world's first attempt to create a nuclear weapons-free zone in a populated area.² However, the treaty is called an idealistic failure because Brazil and Argentina, the Latin American nations most capable of building nuclear weapons³, have refused to comply with the treaty. Lewis A. Dunn describes the Treaty of Tlatelolco as a partial success or "draw" in the international effort to prevent the spread of nuclear weapons. In Dunn's view, the Treaty of Tlatelolco succeeded in the creation of "an almost nuclear-free zone." The conspicuous absence of Argentina and Brazil prevents the treaty from being called a success. Therefore, Dunn concluded that "the Treaty of Tlatelolco remains as much nuclear non-proliferation promise as reality."⁴

The recent actions by the civilian presidents of Brazil and Argentina offer hope for achieving the goal of the Treaty of Tlatelolco. In July 1991, President Menem declared that "from this point on, nuclear development will be for peace, never for death." Menem stated that "it is quite possible"

² The 1959 Antarctic Treaty succeeded in prohibiting all nuclear weapons testing, deployment, and storage of radioactive waste disposal on the largely unpopulated continent. See G. Pope Atkins, Latin America in the International Political System (Boulder, CO: Westview Press, 1989), 340-360.

³ See Chapter V. History of Nuclear Programs

⁴ Lewis A. Dunn, "Four Decades of Nuclear Non-Proliferation: Some Lessons from Wins, Losses, and Draws," in Aspen Strategy Group Report, New Threats: Responding to the Proliferation of Nuclear, Chemical, and Delivery Capabilities in the Third World (Lanham, Maryland: University of America Inc., 1990), 249.

that Argentina and Brazil will end up signing the Treaty of Tlatelolco.⁵ What are the justifications for such optimism regarding the Brazilian-Argentine agreement signed in Guadalajara?

A democratic *Zeitgeist* has swept through Latin America over the past decade. The renewed legitimacy of democracy has attracted international attention to the possibility for stable democracies in Argentina, Uruguay, Brazil, and Chile. In 1989, even Paraguay had its "democratic spirits boosted" by the overthrow of General Stroessner, the hemisphere's longest serving dictator.⁶

The rise of democratic regimes in Argentina and Brazil has reduced the military competition and distrust between these two nations. There appears to be a relationship between the process of democratization and gradual "denuclearization" in Argentina and Brazil. The civilian leaders have taken steps to reduce friction between their nations and have promised to abandon nuclear weapons programs begun during past military regimes. The potential for a military backlash against these civilian initiatives cannot be ignored. Will the success of any effort to end nuclear weapons research be dependent upon the strengthening of democracy in both

⁵ "Argentina, Brazil Sign Nuclear Treaty," (in Spanish), NOTICIAS ARGENTINAS, 18 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-139, 19 July 1991), 26.

⁶ Larry Diamond, Juan Linz, and Seymour Martin Lipset, Eds., Democracy in Developing Countries: Latin America (Boulder, CO: Lynne Rienner Publishers, 1989), 52.

nations? What are the reasons for hope (and grounds for skepticism) that a nuclear weapons-free Latin America envisioned by the Treaty of Tlatelolco will be achieved?

This thesis contains eight chapters. First, the Treaty of Tlatelolco is examined to show how its basic flaws are partially the result of the enduring distrust between Argentina and Brazil. The next chapter identifies the requirements for building an atomic weapon. The third chapter briefly assesses the strengths and weaknesses of the International Atomic Energy Agency (IAEA) safeguards in preventing the proliferation of nuclear weapons. Fourth, the nuclear programs in Argentina and Brazil are addressed in detail to show how both nations have crossed the thin line separating peaceful nuclear research from the pursuit of atomic weapons. The fifth chapter explains how the Argentine-Brazilian nuclear competition is a result of the historical rivalry between these nations. Sixth, the relationship between democratization and the declining nuclear rivalry between Argentina and Brazil is explored. The end of military rule has coincided with the "denuclearization" of weapons research programs in both nations.

The seventh chapter examines the costs and benefits of the Guadalajara agreement for Argentina and Brazil. The Guadalajara agreement is the latest step in the process of nuclear rapprochement. Can the verification procedures established in this accord guarantee an end to

the secretive nuclear weapons programs pursued by the Argentine and Brazilian militaries? Do the newborn democratic governments have the strength to ensure enduring civilian supremacy over the armed forces?

The final chapter explores the implications of the Guadalajara Accord for U.S. non-proliferation policy. The conclusion proposes different policy options available to the United States.

II. HISTORY OF THE TREATY OF TLATELOLCO

In the early 1960s, the effort to prevent the proliferation of nuclear weapons in Latin America began under the leadership of Brazil. In 1961, Brazilian President João Goulart sent a draft resolution to the United Nations General Assembly proposing the creation of a nuclear weapons-free zone in Latin America. Brazil feared that any regional acquisition of nuclear weapons would stimulate an extremely expensive and dangerous arms race. Goulart stated that because no nuclear weapons were present in the region, their introduction would be destabilizing.

Goulart was Brazil's president from August 1961 until the March 1964 military coup. Despite the growing tensions between Goulart (a civilian) and the military, the Brazilian armed forces supported his *initial* anti-nuclear stance because they feared Argentina's technological advantages in nuclear research. However, after the coup, the Brazilian enthusiasm for a nuclear weapons-free zone declined under the first military president, General Castello e Branco.⁷

The initial Argentine reaction to Goulart's proposal was skeptical. However, the rest of Latin American received the proposal with enthusiasm. Cuba eagerly supported the proposal. Cuba amended the proposal to

⁷ Bolívar Lamounier, "Brazil: Inequality Against Democracy," in Diamond, Linz and Lipset, Eds., Democracy in Developing Countries, 124-126.

included Puerto Rico and the Panama Canal Zone. Cuba called for the removal of all foreign military bases from Latin America (especially the U.S. naval station at Guantánamo Bay). The United States opposed the Cuban amendment and exerted pressure on the United Nations General Assembly not to vote on the resolution during 1961.⁸

The Cuban missile crisis demonstrated the destabilizing potential of nuclear weapons and fueled fears of dangerous nuclear proliferation in the region. Many Latin American nations feared being drawn into the rage of a superpower conflict.⁹ In 1963, President João Goulart initiated the Five Presidents' Declaration calling for a nuclear weapons-free Latin America. The presidents of Bolivia, Brazil, Chile, Ecuador, and Mexico signed the declaration. First, they believed that the absence of nuclear weapons would reduce the danger of being targeted with nuclear weapons by either superpower. Second, they thought the introduction of nuclear weapons might cause political instability and increase regional tensions. The United Nations General Assembly formally supported the Five Presidents' Declaration on 27 November 1963.

⁸ Atkins, Latin America, 337.

⁹ The Soviet Union made a pledge following the Cuban missile crisis not to place offensive nuclear weapons in Cuba. However, nuclear-capable ships and aircraft of the Soviet Union have made regular port visits in Cuba. See William M. Arkin and Richard W. Fieldhouse, Nuclear Battlefields: Global Links in the Arms Race (Cambridge: Ballinger Publishing Co., 1985), 138, 264.

After the Brazilian military coup in 1964, Mexico assumed a leadership role in the anti-nuclear weapons movement, sponsoring a conference in November 1965 to prepare a draft treaty. Ever since Argentina refused to sign the Five Presidents' Declaration, Brazil suspected Argentina of having intentions to develop nuclear weapons. The 1966 military coup in Argentina heightened the suspicions of Brazil. At the same time, the Brazilian military adopted the "Doctrine of National Security." This doctrine gave the Brazilian armed forces a greater role in economic policy, internal security, and suppression of leftist opposition groups.¹⁰ The military governments in both Argentina and Brazil made national security issues a top priority, creating a vicious cycle of distrust between these nations.

The treaty negotiations took more than two years because of disagreements over transit rights for nuclear-capable ships and aircraft. The second reason for the prolonged negotiations concerned the "entry into force" provisions.

The dispute over the transport of nuclear weapons on ships and aircraft pitted the United States against most Latin American governments. The United States insisted on freedom for ships and aircraft with nuclear weapons to transit through Latin America. Many Latin American

¹⁰ Maria Helena Moreira Alves, State and Opposition in Military Brazil (Austin: University of Texas Press, 1985), 6.

representatives at the treaty negotiations claimed that the United States position undermined the entire purpose of the treaty. The Mexican delegates were most adamant that U.S. ships carrying nuclear weapons in Latin American waters would be a gross violation of the intent of a nuclear weapons-free zone.¹¹ The U.S. delegates were, however, successful in ensuring that the treaty allowed the free transit of ships and aircraft throughout the region. The United States also maintained its policy of "neither confirming nor denying" (NCND) the presence of nuclear weapons on any of its ships or aircraft.¹²

The second point of contention during the treaty negotiations concerned the "entry into force" provisions. A treaty "enters into force" when a party to the treaty completes the ratification process. The signing of the treaty document is only the first step. Ratification by the nation's legislature is also required.

The distrust between Argentina and Brazil made each unwilling to allow the treaty to become effective until the other complied with all treaty obligations. Brazil would not comply with the treaty until Argentina

¹¹ U.S. Senate, Committee on Foreign Relations, Additional Protocol I To The Treaty For The Prohibition Of Nuclear Weapons In Latin America (95th Congress, 2nd Session, 15 August 1978), 47.

¹² Appendix A addresses the issue of nuclear transit rights for ships and aircraft under the Treaty of Tlatelolco. There has been far less opposition to port visits by nuclear weapons-capable U.S. Navy ships in Latin America than in many other areas of the world, such as New Zealand and Japan.

completed the ratification process, and Argentina made a similar demand. Therefore, Article 28 requires the ratification of the treaty by every Latin American nation before the treaty can enter into force. The treaty allows individual signatories to waive the entry into force provision. Of the 26 signatories, only three have refused to waive this provision: Argentina, Brazil, and Chile.¹³

Treaty ratification is a two-step process. First, each nation must deposit "an instrument of ratification" with the treaty organization office in Mexico that documents legislative approval of the pact. Second, the signatory nation must complete safeguard negotiations with the IAEA. As a result of Article 28, the Treaty of Tlatelolco has not prevented the pursuit of nuclear weapons by either Argentina or Brazil.

Despite these two important limitations, the Treaty for the Prohibition of Nuclear Weapons in Latin America was signed on 14 February 1967. The treaty headquarters are in Tlatelolco (a section of Mexico City), and the treaty is therefore known as the Treaty of Tlatelolco. The treaty called for the total prohibition of the use, deployment and manufacture of nuclear weapons in the region. The preamble of the Treaty of Tlatelolco claimed that the military denuclearization of Latin America would have the following benefits:

¹³ Edmund Jan Osmanczyk, The Encyclopedia of the United Nations and International Agreements (Philadelphia: Talyor and Francis, 1985), 805.

[The Treaty of Tlatelolco] will spare the peoples [of Latin America] from the squandering of their limited resources on nuclear armaments and will protect them against possible nuclear attacks on their territories, and will also constitute a significant contribution towards preventing the proliferation of nuclear weapons and a powerful factor for general and complete disarmament.¹⁴

The basic treaty is only for Latin American signatories. It outlaws the "testing, use, manufacture, production, or acquisition by any means whatsoever of any nuclear weapons." The treaty allows signatories to pursue peaceful uses of nuclear energy, but requires complete compliance with IAEA safeguards. In 1969, the Treaty of Tlatelolco Council established the Organization for the Prohibition of Nuclear Weapons in Latin America (OPANAL) was established as an addition control mechanism to complement the IAEA. OPANAL is far less effective than the IAEA because of inadequate funding.

The Treaty of Tlatelolco contains two protocols in addition to the basic document. Protocol I "commits external states with dependent territories inside the zone to place those territories under the same restrictions." Protocol I is for the four nations with territorial holdings in Latin America: France, the United Kingdom, the Netherlands, and the United States.¹⁵ Protocol II asked the global nuclear powers to respect the

¹⁴ Preamble of the Treaty of Tlatelolco, see Osmanczyk, The Encyclopedia of UN Agreements, 803.

¹⁵ All nations (except France) with territorial holdings in Latin America have ratified Protocol I: the United Kingdom in 1969, the Netherlands in 1970,

"non-nuclear status of Latin America, and not to use or threaten to use nuclear weapons against them."¹⁶ The declared global nuclear powers are the United States, the Soviet Union, the United Kingdom, France, and China. All five of these nations have signed and ratified Protocol II.

The United Nations General Assembly enthusiastically endorsed the treaty on 5 December 1967. The General Assembly was optimistic that a nuclear-free zone in Latin America would be easier to maintain than elsewhere in the Third World.¹⁷ This optimism resulted from three factors. First, the regional disputes in Latin America were not as likely to explode as in many other areas of the Third World. Second, the common cultural background and growing economic interdependence made tensions between Latin American neighbors less volatile than in other parts of the globe. Finally, nuclear weapons have not become a part of the security posture of any country in the region. Therefore, the costs involved in the acquisition of nuclear weapons would discourage their development.¹⁸

Despite the optimism of the General Assembly, the Treaty of Tlatelolco has achieved only qualified success over the past twenty-four years. Table I provides a list of the ways that the Treaty of Tlatelolco has

and the United States in 1981. See Atkins, Latin America, 338.

¹⁶ Atkins, Latin America, 338.

¹⁷ Osmanczyk, The Encyclopedia of UN Agreements, 803.

¹⁸ Michael A. Morris and Victor Millán, Controlling Latin American Conflicts (Boulder, CO: Westview Press, 1983), 117-129.

not achieved its goal of creating a nuclear weapons-free continent in Latin America.

Table I
Why the Treaty of Tlatelolco Remains Incomplete

a.	The United States has insisted on transit rights for nuclear weapons on ships and aircraft.
b.	France has not ratified Protocol I.
c.	Seven nations in Latin America have not signed the treaty. Of these nations, only Cuba has a nuclear program. Cuba refuses to sign the treaty, allegedly in protest over the U.S. naval base at Guantánamo Bay.
d.	Full-scope IAEA safeguards negotiations are not completed for all signatories (especially in Argentina and Brazil).
e.	Argentina has not ratified the treaty.
f.	Brazil and Chile have not waived "entry into force" provisions.

The United States position on nuclear transit rights continues to be controversial in Latin America. The presence of any nuclear weapons in the region (even at sea) undermines the "spirit" of the treaty for many Latin Americans. The United States recently took steps to reduce this nuclear transit rights controversy. President Bush announced the withdrawal and placing into storage of all nuclear weapons from U.S. surface ships and

attack submarines on 27 September 1991.¹⁹ This move by President Bush reduces the peacetime importance of the U.S. position on transit rights of nuclear weapons in the region, although the United States may deploy such weapons at sea in crisis or wartime situations.

The French refusal to ratify Protocol I was the subject of United Nations General Assembly Resolution (44/104) in 1989. The resolution identified France's failure to ratify Protocol I as an obstacle to the treaty's success.²⁰ France signed Protocol I in 1979, but has failed to ratify it. Thus, the government of France has not pledged to militarily denuclearize its holdings in French Guiana, Martinique, and Guadeloupe. France argues that those Caribbean entities are integral parts of the metropole and that it has the prerogative to establish nuclear devices on French territory if it so wishes.²¹

There are 33 independent nations in Latin America. The basic treaty has been signed by twenty-six Latin American nations, leaving only seven nations that have not signed it. These seven nations are Cuba, Belize, Guyana, Dominica, St. Christopher-Nevis, St. Lucia, and the Grenadines. Cuba refuses to sign the treaty because of its strained relations with the United States and the presence of the U.S. naval station at Guantánamo

¹⁹ R. Jeffrey Smith, "President Orders Sweeping Reductions in Strategic and Tactical Nuclear Arms," The Washington Post (28 September 1991), A1.

²⁰ UN Disarmament Yearbook (Volume 14, 1989), 193.

²¹ Atkins, Latin America, 338.

Bay. Cuba does not have the capability to produce nuclear weapons.²² The four island nations of Dominica, St. Christopher-Nevis, St. Lucia, and the Grenadines are still considering the treaty. None of these nations has any nuclear energy ambitions.

Belize and Guyana are prevented from signing the treaty because of territorial disputes with their neighbors. Neither nation is able to build nuclear weapons. The treaty language prevents Belize and Guyana from joining the treaty until their territorial disputes dating back to the colonial rule are resolved. Negotiations are in progress between Belize and Guatemala over their disputed territory. Similar talks are underway between Guyana and Venezuela over the Essequibo River dispute.²³ The completion of these negotiations may lead to the inclusion of Belize and Guyana in the Treaty of Tlatelolco.

Out of twenty-six Latin American nations that have signed the treaty, only eighteen nations have completed safeguards negotiations with the IAEA. Article 13 of the Treaty of Tlatelolco placed time limitations for the completion of negotiations with the IAEA.

Art. 13. Each Contracting Party shall negotiate multilateral or bilateral agreements with the International Atomic Energy Agency for the application of its safeguards to its nuclear activities. Each Contracting

²² Chapter V of this thesis addresses Cuban nuclear capabilities.

²³ Jack Child, Geopolitics and Conflict in South America (New York: Praeger, 1984.), 159.

Party shall initiate negotiations within a period of 180 days after the date of deposit of its instrument of ratification of this Treaty. These agreements shall enter into force, for each Party, not later than eighteen months after the date of initiation of such negotiations except in case of unforeseen circumstances or force majeure.²⁴

The time requirements specified in Article 13 appear to have been unrealistic because of the long delay in completing negotiations with the IAEA. The eighteen signatories with active IAEA safeguard agreements are: Barbados, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela.²⁵ The following tables present data on the participation of Latin American nations in two important nuclear proliferation treaties. Table II presents the status of the Treaty of Tlatelolco. Table III lists the Latin American nations subscribing to the Non-Proliferation Treaty (NPT). The NPT is not specifically addressed in this thesis, but a great degree of overlap exists between the goals of the NPT and the Treaty of Tlatelolco.

²⁴ O'smanczyk, The Encyclopedia of the UN Agreements, 804.

²⁵ Leonard S. Spector, The Undeclared Bomb (Cambridge, MA: Ballinger Publishing Co., 1988), 466.

Table II
Status of the Treaty of Tlatelolco

<u>TREATY OF TLATELOLCO</u>			
	Year of Signature	Year of Ratification	IAEA Safeguards
Argentina	1967	--	Partial
Antigua	1983	1983	No
Bahamas	1967	1976	No
Barbados	1968	1969	Yes
Belize	--	--	--
Bolivia	1967	1969	Yes
Brazil	1967	1968*	Partial
Chile	1967	1974*	Yes
Colombia	1967	1972	Yes
Costa Rica	1967	1969	Yes
Cuba	--	--	--
Dominica	--	--	--
Dominican Republic	1967	1968	Yes
Ecuador	1967	1969	Yes
El Salvador	1967	1968	Yes
Grenada	1975	1975	No
Grenadines	--	--	--
Guatemala	1967	1970	Yes
Guyana	--	--	--
Haiti	1967	1969	No
Honduras	1967	1968	Yes
Jamaica	1967	1969	Yes
Mexico	1967	1967	Yes
Nicaragua	1967	1968	Yes
Panama	1967	1971	Yes
Paraguay	1967	1969	Yes
Peru	1967	1969	Yes
St. Christopher	--	--	--
St. Lucia	--	--	--
Suriname	1976	1977	Yes
Trinidad/Tobago	1967	1975	No
Uruguay	1967	1968	Yes
Venezuela	1967	1970	Yes

-- Treaty not signed and/or ratified

* Entry-into-force provision has not been waived.

Source: Leonard S. Spector, Nuclear Ambitions
(San Francisco: Westview Press, 1990), 466.

Table III
Status of the Nuclear Non-Proliferation Treaty
(NPT) in Latin America

<u>NUCLEAR NON-PROLIFERATION TREATY</u>	
	<u>Year NPT Ratified</u>
Argentina	**
Antigua	1985
Bahamas	1976
Barbados	1980
Belize	1985
Bolivia	1970
Brazil	**
Chile	**
Colombia	1986
Costa Rica	1970
Cuba	**
Dominica	1968
Dominican Republic	1971
Ecuador	1969
El Salvador	1972
Grenada	1975
Grenadines	1984
Guatemala	1970
Guyana	**
Haiti	1970
Honduras	1973
Jamaica	1970
Mexico	1969
Nicaragua	1973
Panama	1977
Paraguay	1970
Peru	1970
St. Christopher	1983
St. Lucia	1979
Suriname	1976
Trinidad/Tobago	1986
Uruguay	1970
Venezuela	1975
** Nations that have neither signed nor ratified the Treaty.	
Source: Joseph F. Pilat, <u>Beyond 1995: The Future of the NPT Regime</u> (New York: Plenum Press, 1990),	

Argentina is the only signatory of the Treaty of Tlatelolco that has not ratified the treaty because of issues of "national sovereignty and independence."²⁶ Argentina opposes any international inspections of its nuclear program. During treaty negotiations, Argentina wanted its right to develop "peaceful nuclear explosives" (PNEs) protected by the treaty.

Argentina believed it had the sovereign right under Article 18 to "carry out [nuclear] explosions for peaceful purposes." However, virtually all other parties to the treaty accepted the U.S. and Soviet position that all nuclear explosives have military applications and should be forbidden under the treaty. The U.S.-Soviet interpretation is based on Article 5 of the Treaty that outlaws all nuclear explosives "that are appropriate for warlike purposes."²⁷ Some proliferation experts assume that Argentina's position on "peaceful nuclear explosives" was an effort to legitimize its efforts to build a nuclear warhead.

Brazil and Chile responded to the Argentine refusal to ratify the treaty by refusing to waive the entry into force provision. However, Chile (unlike Brazil) allows IAEA inspections at all of its nuclear facilities. Until recently, Argentina and Brazil were unwilling to renounce nuclear

²⁶ Richard Kessler, "Peronists seek "Nuclear Greatness," The Bulletin of Atomic Scientists (Volume 45, Number 4, May 1989), 13.

²⁷ Leonard S. Spector and Jacqueline R. Smith, Nuclear Ambitions: The Spread of Nuclear Weapons 1989-1990 (San Francisco: Westview Press, 1990), 431.

explosions and refused to accept "full-scope" IAEA safeguards. This has been the primary stumbling block preventing the completion of the Treaty of Tlatelolco. Brazil and Argentina do not allow IAEA inspections at certain nuclear facilities developed with "indigenous" technology. An end to the nuclear rivalry between Argentina and Brazil is essential before "full-scope" IAEA safeguards can be established.

This thesis is devoted to examining the important role of nuclear rapprochement between Argentina and Brazil in fulfilling the objectives of the Treaty of Tlatelolco. Chile has expressed the desire to waive the entry into force provision, if Argentina ratified the treaty. Cuba would then be the sole Latin American nation with a nuclear energy program not subscribing to the treaty. This would further isolate Cuba from its Latin American neighbors, possibly providing the leverage necessary to encourage Cuba to sign and ratify the treaty. Therefore, the nuclear rapprochement between Argentina and Brazil is the most important step in ending the threat of nuclear proliferation in Latin America. The next section of this thesis examines the requirements for building nuclear weapons.

III. NUCLEAR WEAPONS PRODUCTION REQUIREMENTS

Argentina and Brazil will be capable of producing nuclear weapons before the end of the decade.²⁸ This capability is the result of decades of research and investment. This chapter presents the essential "shopping list" for building an atomic weapon. A later chapter measures the progress achieved by Argentina and Brazil in accumulating these ingredients.

The construction of an atomic weapon is expensive because it requires advanced technologies and specialized facilities. The most challenging task in making the bomb is producing fissile material.²⁹ Fissile material is either plutonium or highly enriched uranium that makes up the central core of a nuclear device. Plutonium or enriched uranium is required to produce the self-sustaining chain reaction called fission. Nuclear fission is the splitting of the uranium isotope (U^{235}) or the plutonium isotope (P^{239}) which produces tremendous amounts of energy.³⁰

²⁸ Spector, Nuclear Ambitions, 221.

²⁹ David Albright and Mark Hibbs, "Iraq and the Bomb," The Bulletin of Atomic Scientists (Volume 47, Number 2, March 1991), 17.

³⁰ Advanced nuclear weapons (also called thermonuclear devices) result from nuclear fusion where light isotopes of hydrogen are joined at high temperatures to produce greater energy than is possible by nuclear fission. Thomas B. Cochran, William M. Arkin, and Milton M. Hoenig, U.S. Nuclear Forces and Capabilities (Cambridge, MA: Ballinger Publishing Company, 1984), Chapter 2.

The IAEA considers the following quantities of nuclear material to be significant: eight kilograms of plutonium or twenty-five kilograms of weapons-grade uranium. Either amount is enough to build one simple nuclear device.³¹ However, smaller quantities of plutonium or enriched uranium could be enough to make an atomic warhead using advanced theoretical computations and high-grade materials.³²

Once fissile material is available, the production of an atomic bomb requires the following capabilities, according to David Albright and Mark Hibbs:

- **Tamper or reflector** to surround the fissile material, holding it together while fission occurs and reflecting neutrons to speed the fission process.
- **High explosives** in the form of shaped charges to compress the tamper and fissile material creating the critical mass necessary for fission.
- **Fuzing system** capable of timing the explosion of the shaped charges within a fraction of a microsecond.
- **Theoretical calculations** to design the physical properties of the bomb and to predict the yield of the weapon. Supercomputers are not necessary for these calculations, but are helpful.
- **Implosion package testing** using flash X-ray machines and high speed cameras to determine the compression achieved in the nuclear core.
- **Weaponization** or the ability to deliver the bomb or warhead by aircraft or missile.³³

³¹ The IAEA's definition of significant amounts of fissile material is explained in Leonard Weiss, "Tighten Up On Nuclear Cheaters," The Bulletin of the Atomic Scientists (Volume 47, Number 4, May 1991), 12.

³² Spector, Nuclear Ambitions, 417.

³³ Albright and Hibbs, "Iraq and the Bomb," 18.

Despite the complexity of the tasks identified by Albright and Hibbs, the most difficult part in building an atomic weapon is the production of fissile material. The manufacturing of atomic weapons is relatively easy to accomplish in comparison to the production of fissile material. Uranium U^{235} and plutonium P^{239} require highly complex and expensive production facilities.

A. THE URANIUM ENRICHMENT METHOD OF PRODUCING FISSILE MATERIAL

The uranium enrichment process begins with natural uranium that contains only 0.7% of U^{235} isotope. The percentage of U^{235} may be increased by methods such as gaseous diffusion, jet nozzle, ultracentrifuge or even laser technologies. An atomic bomb requires enriched uranium with a very high percentage of U^{235} , normally over 90% to become weapons-grade. It is possible to produce a bomb with uranium enriched to as low as only 20% U^{235} . The volume of low-enriched uranium needed to make such a bomb would be impractical.³⁴ Table IV lists the various grades of enriched uranium and their uses for nuclear energy or atomic weapons.

³⁴ An explanation of the uranium enrichment process can be found in David Albright, "Bomb Potential for South America," The Bulletin of Atomic Scientists (Volume 45, Number 4, May 1989), 16-20.

Table IV
Grades of Uranium

GRADES OF URANIUM

Natural - contains about 0.7% of the fissile isotope U^{235} ; used in reactors moderated with heavy water or graphite.

Slightly enriched - up to about 5% U^{235} ; used in conventional nuclear reactors moderated with ordinary water.

Low-enriched - up to 20% U^{235} ; used in many research reactors.

Medium-enriched - between 20% and 50% U^{235} ; potentially usable for nuclear weapons, but in very large quantities.

Highly-enriched - above 50% U^{235} ; begins to become useful for nuclear weapons and naval propulsion reactors.

Weapons-grade - above 90% U^{235} ; used in nuclear weapons, research reactors and most naval propulsion reactors.

Source: David Albright, "Bomb Potential for South America," The Bulletin of Atomic Scientists (Volume 45, Number 4, May 1989), 16.

The uranium enrichment process involves many steps.³⁵ The IAEA and the Nuclear Supplier Guidelines (NSG) attempt to safeguard uranium enrichment technologies. The IAEA and NSG efforts make the clandestine procurement of nuclear technologies difficult, but not impossible for

³⁵ Detailed information on the uranium enrichment process can be found in Harvey W. Graves, Jr., Nuclear Fuel Management (New York: John Wiley & Sons, 1979), Chapter 2.

ambitious nations.³⁶ Argentina and Brazil invested in uranium enrichment facilities to achieve an independent nuclear fuel cycle and to become nuclear exporters. Enrichment technologies are necessary to achieve an independent nuclear fuel cycle capability. Both nations wanted the ability to manufacture enriched nuclear fuel using their ample supplies of natural uranium. Sara Tanis and Bennett Ramberg describe uranium enrichment technology as an important step towards "nuclear autarky," whereby Argentina and Brazil could minimize foreign leverage over their nuclear industries.³⁷ Figure 1 presents a flow chart of these steps in the enrichment process.

³⁶ Zachary S. Davis, "Non-Proliferation Regimes: A Comparative Analysis," CRS Report for Congress (Washington: Congressional Research Service, 1 April 1991), 3-17.

³⁷ Sara Tanis and Bennett Ramberg, "Argentina," in William C. Potter, Ed., International Nuclear Trade and Nonproliferation: The Challenge of the Emerging Suppliers (Lexington, MA: Lexington Books, 1990), 97.

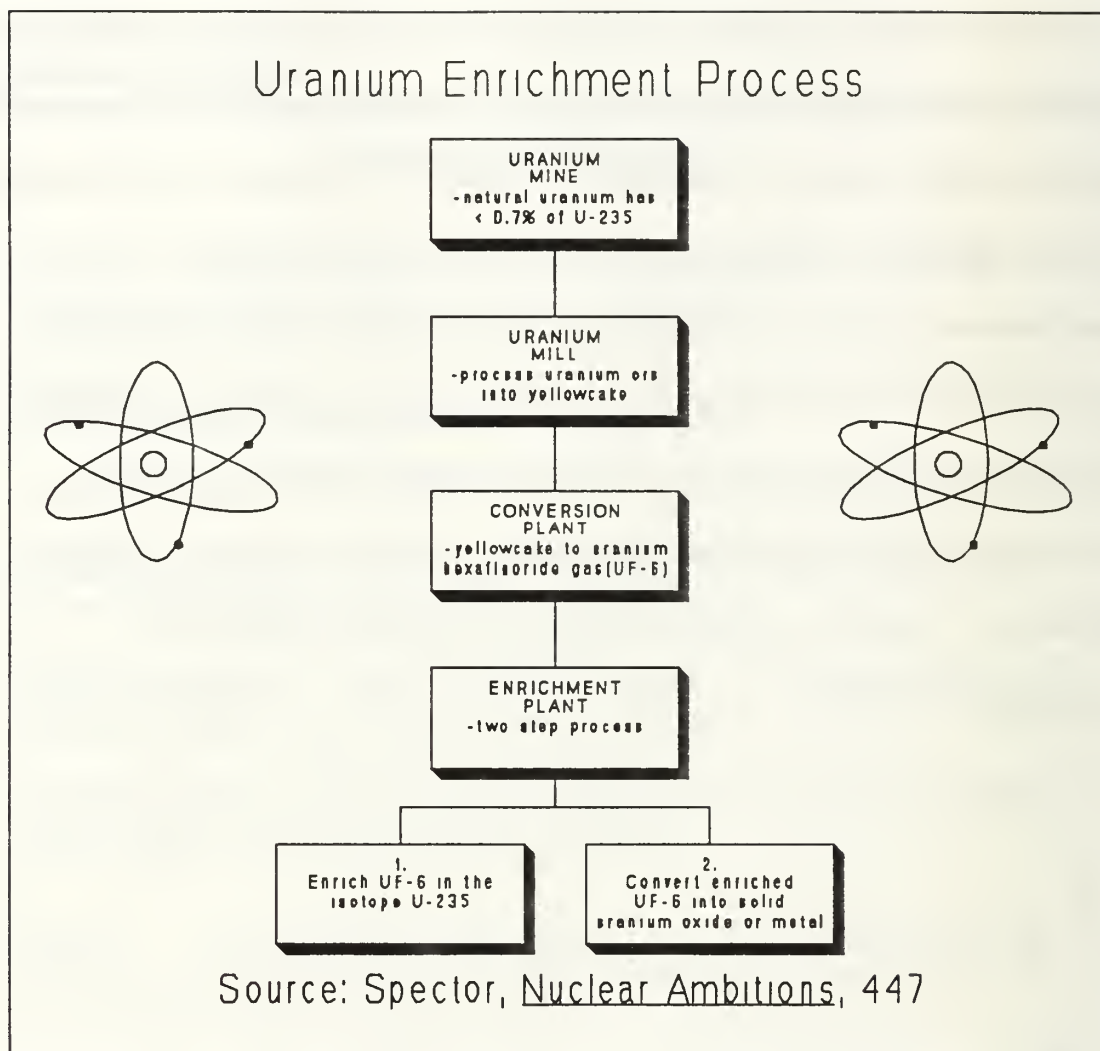


Figure 1
Enriched Uranium Production Process

The second reason for Argentina and Brazil to invest in uranium enrichment technologies was to become nuclear exporters. During the late 1970s, nuclear power was expected to rival petroleum as the world's most important energy source. Fear of the growing power of OPEC influenced the United States to plan to build over 230 nuclear reactors to reduce U.S.

dependence on oil.³⁸ The U.S. did not complete all of these planned reactors because of domestic opposition, relatively low oil prices, and the declining power of OPEC during the 1980s. However, Argentina and Brazil made investments in uranium enrichment facilities when nuclear fuel exports were expected to become lucrative. Brazilian Minister of Mines and Energy, Caesar Cals, made the following statement in 1976: "countries with an effective capacity to exploit and enrich uranium will have more strength in the world than the present oil producers."³⁹

The demand for nuclear power has not expanded as predicted during the 1970s when emerging nuclear-supplier states (such as Argentina and Brazil) made their investment decisions in nuclear infrastructure. The need to justify past investments will cause increased competition for nuclear exports that could lead to increased unsafeguarded nuclear transfers. Nuclear fuel exports provide Argentina and Brazil with hard currency needed for their economies. Former Brazilian President José Sarney of Brazil underscored the importance of nuclear exports (especially enriched uranium fuels) in the following statement made in September 1987:

In the future as today, nuclear energy will constitute one of the major markets in the industrialized world. We should prepare for that future,

³⁸ Antony V. Nero, Jr., A Guidebook to Nuclear Reactors (Los Angeles, University of California Press, 1979), 22.

³⁹ Caesar Cals cited in Etal Solingen, "Brazil: Technology, Countertrade, and Nuclear Exports," in Potter, Ed., International Nuclear Trade, 116.

in order to share in it, by developing technology, producing reactors, and *selling fuel*.⁴⁰

Another reason for investments in uranium enrichment technology was the production of weapons-grade fissile material. Highly-enriched uranium can be used for research reactors, nuclear submarine propulsion or an atomic bomb. Argentina and Brazil built clandestine enrichment facilities. The pursuit of an autonomous nuclear fuel cycle and the development of a nuclear export potential would not have required the degree of secrecy surrounding some of the enrichment facilities in both nations. According to the Aspen Strategy Group, Argentina and Brazil built secret facilities for military production of nuclear materials. These facilities were designed, constructed, and maintained without IAEA safeguards.⁴¹

Leonard Spector concluded that the clandestine enrichment facilities were intended to build a nuclear weapon because:

...it seems highly unlikely that Brazil [or Argentina] would have gone through these lengths simply to obtain research reactor fuel or to improve its maritime capabilities in the next century.⁴²

Chapter V of this thesis addresses the specifics of the Argentine and Brazilian nuclear weapons research programs. Now we turn to the second

⁴⁰ Potter, Ed., International Nuclear Trade, 111 (emphasis added).

⁴¹ Aspen Strategy Group Report, New Threats, 12.

⁴² Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 41.

method of producing weapons-grade fissile material - the plutonium extraction process.

B. THE PLUTONIUM EXTRACTION METHOD OF PRODUCING FISSILE MATERIAL

A nation needs to have a nuclear reactor to produce plutonium. As the reactor operates, the uranium fuel is transformed into plutonium and highly toxic wastes. The irradiated or "spent" fuel from the reactor can be chemically treated to separate plutonium from the radioactive waste. Specialized facilities called reprocessing plants must be constructed to handle the highly radioactive spent fuel. The plants have thick walls, lead shielding, special ventilation and robotics to prevent radiation hazards.

Plutonium mixed with uranium can be used as a fuel in some nuclear power reactors called breeder reactors.⁴³ Many nations during the 1970s believed that as uranium became scarce, plutonium might become an important alternative fuel for nuclear power plants. Worldwide uranium resources, however, have not become as scarce as predicted. Argentina and Brazil have continued to find increased quantities of uranium ore. Brazil has assured uranium reserves exceeding 190,000 metric tons and Argentina has about 12,000 metric tons.⁴⁴ The availability of uranium combined with

⁴³ Breeder reactors are considered a dangerous proliferation threat because they produce or "breed" larger quantities of plutonium than are initially used to fuel the reactor.

⁴⁴ Spector, Nuclear Ambitions, 238, 260.

the complexity of reprocessing plutonium influenced both nations to slow their development of plutonium extraction facilities. Figure 2 shows the various steps and facilities required to reprocess plutonium from spent uranium fuel.

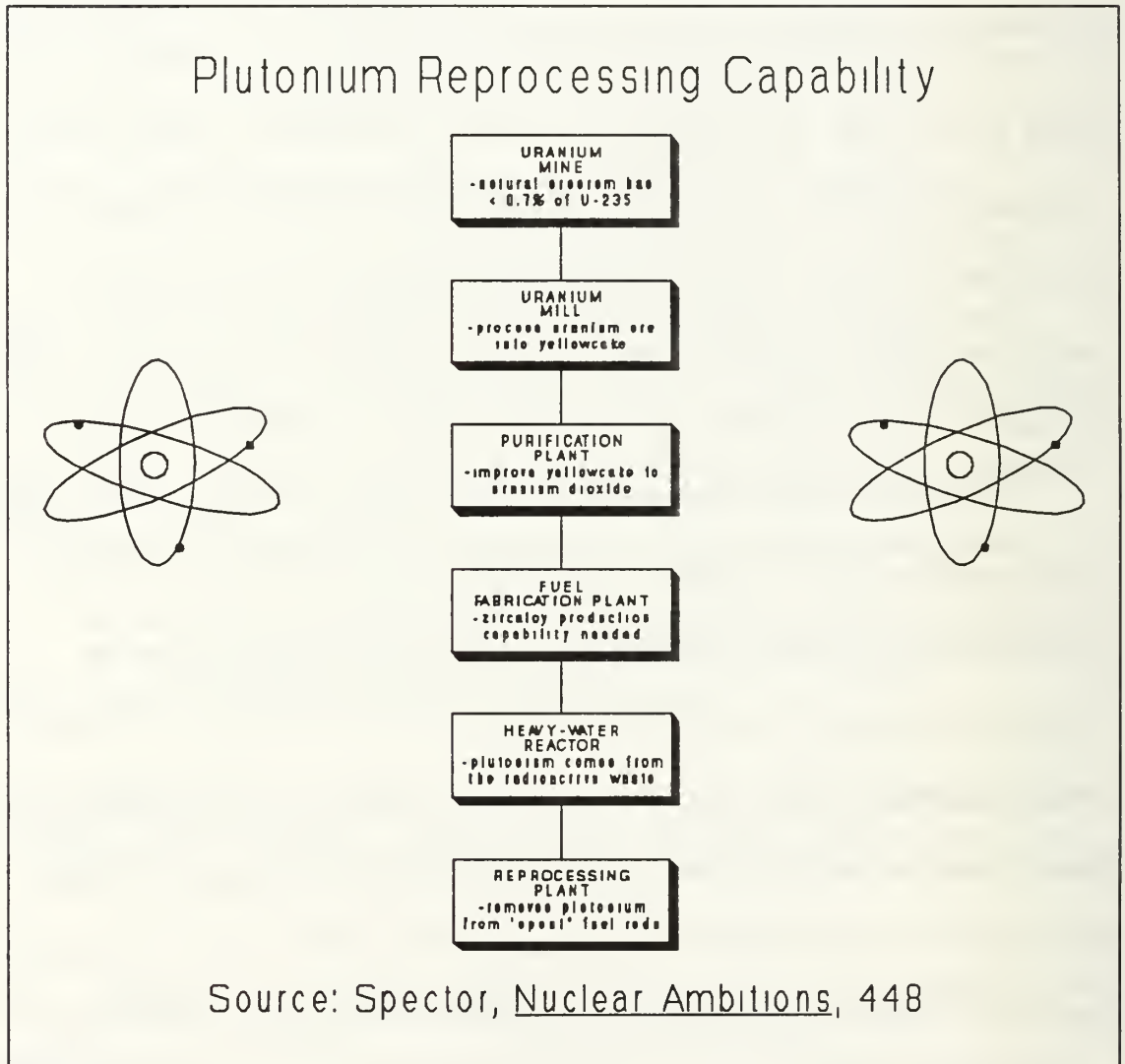


Figure 2
Plutonium Production Process

It appears that the preferred method of nuclear proliferation in Argentina and Brazil during the 1980s was by the uranium enrichment route, not the plutonium path. According to the Aspen Strategy Group, Argentina and Brazil were discouraged from plutonium reprocessing because it was more expensive than uranium enrichment. Uranium enrichment plants have a greater export potential than plutonium reprocessing facilities.⁴⁵ The next chapter of this thesis examines international efforts of the IAEA to prevent nuclear proliferation.

⁴⁵ Aspen Strategy Group Report, New Threats, 3.

IV. INTERNATIONAL ATOMIC ENERGY AGENCY

The destructive capacity of the atomic bomb shocked the world following the attacks on Hiroshima and Nagasaki. The Manhattan Project succeeded in building Albert Einstein's vision of "extremely powerful bombs of a new type."⁴⁶ In 1946, the U.S. proposed the Baruch Plan to take the dangerous aspects of atomic energy out of national hands and place it in the international hands of the United Nations. This effort to prevent the proliferation of nuclear weapons was unsuccessful because the Soviet Union rejected the Baruch Plan.

Nuclear competition between the superpowers has remained a central feature of international relations. The failure of the Baruch Plan caused President Eisenhower to propose his "Atomic Power for Peace" program in a speech delivered to the United Nations General Assembly on 8 December 1953. President Eisenhower called for the creation of the International Atomic Energy Agency (IAEA) by the United Nations. The IAEA would ensure that all fissile material was used "to serve the peaceful pursuits of

⁴⁶ From Albert Einstein's letter to President Franklin Roosevelt on 2 August 1939. See Archelaus R. Turrentine, "Lessons of the IAEA Safeguards Experience," in Lewis A. Dunn, Ed., Arms Control Verification & the New Role of On-Site Inspections (Lexington, MA: Lexington Books, 1990), 39.

mankind." This proposal became known as "Atoms for Peace." The IAEA was created after lengthy negotiations on 29 July 1957.⁴⁷

The introduction of nuclear power plants in Latin America began during the 1950s with the building of research reactors in Argentina and Brazil. The United States "Atoms for Peace" program encouraged the development of nuclear energy around the globe. The "Atoms for Peace" could be called a major U.S. foreign policy mistake from a proliferation standpoint. Despite being based on good intentions, this program provided the technological basis that has actually fostered greater proliferation of nuclear weapons.

A. HISTORY OF IAEA SAFEGUARDS

The IAEA was given a dual mandate: to facilitate the peaceful use of nuclear energy and to prevent the misuse of nuclear materials or facilities for military purposes. The Statute of the IAEA explains this dual mandate:

The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world...It shall establish and administer safeguards designed to ensure fissionable materials, services, equipment, facilities, and information made available by the Agency or under its supervision or control are not used in such a way as to further any military purpose.⁴⁸

⁴⁷ Turrentine, "Lessons of the IAEA Safeguards," 40.

⁴⁸ Statute of the International Atomic Energy Agency (Vienna: IAEA, 1980).

The objective of the IAEA safeguards is the timely detection of any diversion of significant quantities of nuclear material. The IAEA hopes to deter any such diversion by creating the risk of early detection.⁴⁹ The safeguard procedures of the IAEA require a system of strict accounting of fissile material and control over certain nuclear technologies like reprocessing or enrichment facilities.⁵⁰ The safeguards agreements are the result of negotiations between the IAEA and individual countries. Unfortunately, the IAEA negotiations normally do not achieve their stated objectives in the safeguards agreement. If a nation does not declare a laboratory conducting nuclear weapons research to be part of the safeguards agreement, then the facility is not subject to IAEA safeguards.⁵¹

There are three different types of safeguards agreements used by the IAEA to negotiate with a host nation. The first type of safeguards agreement, created in 1961, pertained only to nuclear reactors up to 100 megawatts. In 1965, the IAEA Information Circular 66 (INFCIRC/66) established safeguards for nuclear facilities of all sizes and types.⁵² However, INFCIRC/66 safeguards apply only to specific facilities identified by the host nation for IAEA inspections. INFCIRC/66 establishes only

⁴⁹ Weiss, "Tighten Up On Nuclear Cheaters," 11-12.

⁵⁰ The shortcomings of the IAEA are discussed in "Clouseau in Iraq," The Wall Street Journal (12 August 1991), A10.

⁵¹ Weiss, "Tighten Up On Nuclear Cheaters," 12.

⁵² Turrentine, "Lessons of the IAEA Safeguards," 44.

partial IAEA safeguards. It allows a nation to prevent IAEA inspections at any number of undisclosed nuclear facilities not covered in the agreement. The Treaty of Tlatelolco requires safeguards agreements based on INFCIRC/66. Argentina and Brazil have safeguards agreements with the IAEA based on INFCIRC/66 that allows certain nuclear facilities to be exempt from IAEA inspections.

In 1971, IAEA Information Circular 153 (INFCIRC/153) established a third agreement that requires **full-scope safeguards** of all nuclear facilities in a nation.⁵³ The Treaty for the Non-Proliferation of Nuclear Weapons (NPT) required the full-scope safeguards based upon INFCIRC/153 for of all its signatories. Argentina and Brazil have not signed the NPT and have refused full-scope safeguards agreements with the IAEA because they believe them to be an infringement on their sovereignty. Full-scope safeguards require all nuclear facilities to be open to IAEA inspectors.

B. STRENGTHS OF IAEA SAFEGUARDS

The strengths of the IAEA in preventing the proliferation of nuclear weapons result from the following technical considerations. First, fissile material is valuable and dangerous requiring detailed records and physical security. The IAEA is capable of accounting for this material by examining these records regularly. The IAEA uses security measures such as on-site inspections, cameras, and tamper-proof seals to deter any diversion of fissile

⁵³ Turrentine, "Lessons of the IAEA Safeguards," 43.

material. Inspectors can use gamma ray spectrometers to detect any radioactive fissile material. Second, most nuclear fuel remains in a reactor for several years simplifying the IAEA accounting procedures.⁵⁴ Third, the IAEA adopts a competitive strategy of developing safeguards that try to stay one step ahead of emerging nuclear technologies. Finally, the IAEA can call international attention to the misdeeds of any country violating its safeguards. The IAEA informs the United Nations Security Council and the General Assembly of any violations it encounters.⁵⁵

IAEA safeguards have gained international acceptance since the agency's creation in 1957. In 1962, the United States gave the IAEA the responsibility for safeguarding most U.S. nuclear transactions. This action increased the prestige of the IAEA.⁵⁶

In 1967, the Treaty of Tlatelolco designated IAEA safeguards to be the cornerstone of its nonproliferation efforts. Similarly, the NPT gave the IAEA a major safeguards role in 1970. These two international treaties required IAEA safeguards. This boosted the credibility of the IAEA. The full-scope safeguards established by INFCIRC/153 became a requirement for

⁵⁴ Some nuclear reactors have an on-line refueling capability that permits the removal of irradiated fuels without an extensive shutdown period. These type of reactors require additional safeguards because of the opportunity to divert spent fuels to a plutonium reprocessing plant.

⁵⁵ Turrentine, "Lessons of the IAEA Safeguards," 44.

⁵⁶ One exception was made by the U.S. for the European Atomic Energy Community (EURATOM) that maintained its own safeguards responsibility. See Turrentine, "Lessons of the IAEA Safeguards," 43.

the NPT in 1971.⁵⁷ The non-proliferation mission of the IAEA was further enhanced in 1974 when a group of seven nuclear exporting nations established export controls.

The Nuclear Suppliers Guidelines (NSG) established by the Zangger Committee in 1974 and the London Club in 1975 complemented IAEA safeguards. The NSG maintains "trigger lists" of sensitive nuclear technologies that if exported would require the application of IAEA safeguards. The NSG enhanced the prestige of the IAEA.⁵⁸ Lewis Dunn stated that "nuclear export controls and supplier restraint have significantly complicated, slowed, or increased costs of efforts by problem countries to acquire nuclear weapons."⁵⁹ The limits of export controls must be acknowledged. Some nations have found ways to circumvent export controls. Not all nations follow the NSG guidelines with the same level of commitment. Lucrative nuclear exports can be a strong incentive to ignore London Club guidelines.

C. WEAKNESSES OF THE IAEA SAFEGUARDS

The weaknesses of IAEA safeguards result primarily because the IAEA needs to have the cooperation of the host nation. If the host nations

⁵⁷ Turrentine, "Lessons of the IAEA Safeguards," 43.

⁵⁸ A more complete description of the Nuclear Supplier Guidelines can be found in Zachary S. Davis, "Non-Proliferation Regimes," CRS Report for Congress, 10.

⁵⁹ Dunn, "Four Decades of Nuclear Non-Proliferation," in Aspen Strategy Group Report, New Threats, 238.

desires to deceive or keep information hidden from the IAEA, it will most likely be successful. Archelaus R. Turrentine, former Assistant Director at the U.S. Arms Control and Disarmament Agency, stated that the IAEA inspects only declared nuclear facilities and does not try to uncover secret facilities.⁶⁰ It is difficult for the IAEA to force a nation to reveal deeply held secrets regarding nuclear weapons research.

Hans M. Blix, Director General of the International Atomic Energy Agency, explains the difficulty in preventing the nuclear proliferation. Despite the collective global interest in preventing the spread of nuclear weapons, some nations will act with a Hobbesian self interest.

Nations do not normally undertake or refrain from actions because of such collective interest; they do so because of their individual interests...A nation perceiving that it has a real interest in developing nuclear weapons is not likely to refrain from doing so merely because it is told such development would be bad for the world community.⁶¹

The IAEA also encounters political and financial difficulties because of its dual mandate. The IAEA funded through the United Nations. The IAEA budget is divided between nuclear energy development programs and the maintenance of safeguards. Hans Blix, like all past IAEA Director Generals, faces political pressure from nations desiring IAEA help in

⁶⁰ Turrentine, "Lessons of the IAEA Safeguards," 50.

⁶¹ Joseph F. Pilat and Robert E. Pendley, Beyond 1995: The Future of the NPT Regime (New York: Plenum Press, 1990), ix.

developing their nuclear programs. Many nations want to see greater resources devoted to building nuclear power plants, rather than being "wasted" on safeguards. The 1988 budget of the IAEA was \$155 million with about \$63 million dedicated to the Department of Safeguards.⁶² Most of the safeguards budget is spent on safeguards in nations not considered to be a nuclear weapons proliferation threat. While nations posing the greatest threat to nuclear proliferation are often not being inspected at all by the IAEA.⁶³

A third area of weakness for IAEA safeguards results from the overlap in utility of nuclear facilities for both peaceful and military applications. The IAEA must schedule its inspections in advance, allowing any discrepancies to be hidden. For example, a gaseous diffusion enrichment facility (like the Pilcaniyeu plant in Argentina) can produce 20% enriched uranium for peaceful and military purposes. Increased enrichment levels can be accomplished in the same facility through two methods called *stretching* and *recycling*.⁶⁴ It is difficult for IAEA to monitor such a facility, especially when improper activities can be stopped before the regularly

⁶² Turrentine, "Lessons of the IAEA Safeguards," 42.

⁶³ The emerging nuclear weapons nations are Argentina, Brazil, Iran, Iraq, Libya, North Korea, and Taiwan.

⁶⁴ For detailed information on *stretching* and *recycling* in Argentina and Brazil see Albright, "Bomb Potential for South America," 17-18.

scheduled visits by the IAEA. The host nation can plan to produce only 20% enriched uranium during IAEA scheduled visits.

The predictability of inspections is a major deficiency of the current IAEA safeguards. The advanced warning of upcoming IAEA inspections allows time to correct any safeguards violations. Safeguards could be strengthened by random inspections. Nations with suspected of nuclear weapons research could be targeted with frequent inspections.

The failure of the IAEA to detect Iraq's efforts to build an atomic bomb became evident in 1991. Iraq has allowed IAEA safeguards for the past two decades. The IAEA inspectors, however, did not discover the Iraqi diversion of fissile material. This failure tarnished the IAEA's reputation. The bad publicity for the IAEA may eventually make safeguards stronger because the lessons learned in Iraq will encourage the establishment of random on-site inspections.⁶⁵

In summary, IAEA inspectors regularly visit nearly 900 nuclear facilities in over 50 countries. Their safeguards assure that nuclear materials have not been diverted for military purposes. The IAEA has a membership of 110 nations and has been conducting inspections for over 25 years.⁶⁶ The failure to stop Iraq's secret diversion of fissile material was a

⁶⁵ John Simpson, "NPT Stronger After Iraq," The Bulletin of Atomic Scientists (Volume 47, Number 8, October 1991), 12-13.

⁶⁶ Davis, "Non-Proliferation Regimes," CRS Report for Congress, 8.

blow to IAEA prestige, but should encourage increased funding for the IAEA in the long run. Despite its shortcomings, the IAEA is the best method of controlling the proliferation of nuclear weapons. The IAEA carries an international stamp of approval and legitimacy. The next chapter of this thesis will examine the history of nuclear programs in Argentina and Brazil.

V. HISTORY OF NUCLEAR PROGRAMS

A. LATIN AMERICAN NUCLEAR PROGRAMS

Argentina and Brazil are the only nations in Latin America with large enough nuclear programs to warrant immediate concern for the proliferation of nuclear weapons.⁶⁷ The only other Latin American nations of potential concern for nuclear proliferation are Cuba and Chile. Mexico and Venezuela have only small investments in nuclear power, largely because of the size of their domestic oil reserves. Peru has a small nuclear energy program and has expressed interest in trying to build a pilot-scale fuel-fabrication plant in the Chapi region. Peru's financial and political problems, however, preclude the Fujimori government from making the necessary investments for nuclear weapons research.⁶⁸ Ecuador signed a nuclear agreement with Brazil to begin the supply of technology and expertise for the construction of a nuclear research reactor. Ecuador's

⁶⁷ William C. Potter, Director of the Emerging Nuclear Suppliers Project at the Monterey Institute of International Studies, publishes a quarterly review on the global nuclear trade called Eye on Supply (Monterey, CA: ENSP, 1991). Argentine and Brazil are the only Latin American nations defined to be "emerging nuclear suppliers" capable of exporting nuclear technology.

⁶⁸ Eye on Supply (Number 1, Summer 1990), 8.

nuclear program is in its infant stages, it lacks the resources and political will to grow to any size comparable with the programs of Cuba or Chile.⁶⁹

Cuba is constructing two nuclear power reactors in Cienfuegos with Soviet assistance. These plants are under full-scope IAEA safeguards. In addition, nuclear experts from the United States have inspected safety precautions at Cuba's nuclear construction sites. Following the Soviet nuclear disaster at Chernobyl in 1986, the United States received details of the safety features at the Cuban nuclear plants from both Cuba and the Soviet Union.⁷⁰ In 1989, officials from the U.S. Nuclear Regulatory Commission (NRC) toured the construction site of the Cuban power plants. The NCR concluded that Cuba did not pose a nuclear proliferation threat.⁷¹

Chile has had a modest nuclear research program since 1964; however, its entire program is also under full-scope IAEA safeguards. Chile was concerned by nuclear weapons research occurring in Argentina, but did not respond by trying to build its own atomic bomb. Instead, Chile has attracted international attention to their strict adherence to the IAEA

⁶⁹ Eye on Supply (Number 5, Fall 1991), 7.

⁷⁰ Spector, Nuclear Ambitions, 386.

⁷¹ Joseph B. Treaster, "U.S-Cuban Enmity May Be Relaxing," The New York Times (6 January 1989), A6.

safeguards.⁷² Nuclear proliferation experts agree that Chile is not pursuing nuclear weapons and that the size of its nuclear infrastructure could not support an atomic weapons development program. Leonard Spector claims that Chile's "rudimentary nuclear research program is not of proliferation concern."⁷³

Before addressing the nuclear programs in Argentina and Brazil, the reasons for a nation would pursue nuclear weapons should be listed. Table V presents the basic reasons for a nation to desire nuclear weapons.

Table V
Benefits of Pursuing/Having Nuclear Weapons

a.	Deter attack and/or intimidate adversaries.
b.	Win international prestige.
c.	Satisfy desires of within the military that want nuclear weapons.
d.	Establish a self-sufficient arms industry & modern technology base.

The pursuit of nuclear weapons is not cost-free. Nations pursue nuclear weapons research in secrecy because of the potential international

⁷² Joe Goldman, "Chile Takes the Open Road," The Bulletin of the Atomic Scientists (Volume 46, Number 7, September 1990), 7-8.

⁷³ Spector, Nuclear Ambitions, 386.

and domestic backlash against such a decision to build atomic weapons. The last nation to "declare" its possession of nuclear weapons was China in 1964. Since then, Israel, India, South Africa and Pakistan have obtained the capability to build an atomic bomb. These governments have refrained from "declaring" their nuclear capabilities because of a fear being ostracized by the international community and their own populations. Table VI presents a simplified list of the reasons why a nation would not want to develop nuclear weapons.

Table VI
Costs of Pursuing/Having Nuclear Weapons

a.	Incur the wrath of the international community, resulting in trade sanctions and reduced access to important technology.
b.	Destabilize balance of power in region.
c.	Obligate scarce funds to a project with little economic return.
d.	Reduce military readiness by consuming a large percentage of the defense budget.

B. ARGENTINA'S NUCLEAR PROGRAM

The Argentine nuclear program is the oldest and most sophisticated in Latin America. It began during the late 1940s, when President Juan Perón welcomed German scientists that emigrated to Argentina following World War II. Some of these scientists had taken part in the nuclear fission

program in Nazi Germany.⁷⁴ In 1949, a laboratory at San Carlos de Bariloche in Patagonia began atomic research. The Argentine government established the National Commission for Atomic Energy (CNEA) in 1950 to direct the nation's nuclear programs. Argentina's tradition of excellence in education⁷⁵ and close ties with the European scientific community provided an outstanding foundation to build a successful nuclear research program.

The goal of nuclear autonomy has always been a high priority of the CNEA. The announced goals of CNEA priorities were the constructing of nuclear power plants, achieving a self-sufficient nuclear fuel cycle, and building of an export industry. The development of a nuclear weapons appears to have been a silent goal. The CNEA built a plutonium reprocessing plant at Ezeiza and a clandestine uranium enrichment plant at Pilcaniyeu. Both of these facilities are free from IAEA safeguards. The CNEA leadership has been dominated by military officers. The large degree of military involvement in the CNEA made the diversion of resources to weapons research possible.

⁷⁴ Warren H. Donnelly and Zachary S. Davis, "Argentina, Brazil, and Nuclear Proliferation," CRS Report for Congress (Washington: Congressional Research Service, August 1991), 2.

⁷⁵ Domingo Faustino Sarmiento, Argentina's first civilian president from 1868 to 1874, expressed the desire to modernize his nation and was a strong proponent of public education. See José Enrique Rodó, Ariel (Austin, TX: University of Texas, 1988), 112.

Argentine military tried to obtain nuclear weapons through indigenous development and covert efforts to purchase a weapon from abroad. The 1991 investigation into the international banking scandal of the Bank of Credit and Commerce International (BCCI) alleged that former Argentine president, General Leopoldo Galtieri, negotiated with the bank to buy a nuclear weapon (from an unknown source) in the early 1980s. The investigation concluded, however, that Galtieri was unable to purchase any nuclear weapons.⁷⁶

The success of the Argentine nuclear program has been a source of national pride (as well as military ambition). The following statement by Manuel Mondino, President of CNEA, exemplifies this pride:

Argentina is one of only ten countries that managed to control the uranium enrichment process to use nuclear energy. The country is therefore in the First World.⁷⁷

The Argentine nuclear program is the most independent in Latin America because of its indigenous technical capabilities. Argentina complete its first research reactor (RA-1 at Constituyentes) in 1958. The RA-1 reactor

⁷⁶ "Alleged Purchase of Nuclear Weapons," (in Spanish), NOTICIAS ARGENTINAS, 26 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-145, 29 July 1991), 29.

⁷⁷ "Argentine Foreign Minister Di Tella's Address to the U.N. General Assembly," (in Spanish), NOTICIAS ARGENTINAS, 23 September 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-185, 24 September 1991), 11.

was built with Argentine technology. CNEA allowed IAEA inspectors to examine the facility. A second research reactor (**RA-0** at Córdoba) began operations in 1965. This reactor, also built without external assistance, has never been subject to IAEA safeguards.⁷⁸ Nuclear construction continued during the late 1960s with the completion of two more research reactors and a laboratory-scale plutonium extraction plant at Ezeiza. The Ezeiza reprocessing plant operated without IAEA safeguards from 1969 until 1973 when it was dismantled.

The first nuclear power reactor, **Atucha I**, began operation in 1974. Siemens A.G. of West Germany build Atucha I and required IAEA safeguards. Brazilian officials were suspicious (and jealous) of the Argentine progress. Brazil did not have an operational power reactor until 1982. In 1983, the second Argentine nuclear power plant came on-line at **Embalse**. Technical problems at both the Atucha I and Embalse reactors have forced them to shut down on several occasions.⁷⁹ A third power reactor called **Atucha II** is scheduled for completion in 1993, but is encountering severe financial difficulties. This completion date is uncertain because CNEA must

⁷⁸ Spector, The Undeclared Bomb, 251, 277.

⁷⁹ The environmental organization, Greenpeace, issued a report in April 1991 claiming that major safety violations existed at the Atucha I power plant. CNEA denied these allegations. See Daniel E. Arias, "Could Atucha Explode?" (in Spanish), CLARIN, 21 April 1991, translated and reported by INFO-SOUTH (24 May 1991).

invest at least \$70 million to complete Atucha II during a period of budget cutbacks.⁸⁰

In 1978, Argentina began building a production-sized plutonium extraction plant at Ezeiza. CNEA applied the lessons learned at the laboratory-scale reprocessing plant to this larger project at this same location. Argentine officials agree to partial IAEA safeguards at this facility. Argentina demanded the freedom to produce plutonium without IAEA supervision when reprocessing the spent fuel of its unsafeguarded research reactors.⁸¹

The rated capability of the Ezeiza reprocessing plant is 15 kilograms of plutonium per year. The Ezeiza reprocessing plant began operational tests in 1989 and may have provided Argentina weapons-grade plutonium. President Menem, however, indefinitely suspended the Ezeiza reprocessing project in 1990.⁸² Argentina had poor results with plutonium reprocessing because the process proved to be too expensive. In contrast, Argentina's uranium enrichment program has been very successful.

In 1978, the clandestine construction of Pilcaniyeu enrichment plant began. The existence of this enrichment plant stayed secret for five years. It

⁸⁰ Elonora Gosman, "Nuclear Priorities," (in Spanish), CLARIN, 27 May 1990. translated and reported in INFO-SOUTH (28 June 1991).

⁸¹ Robert Laufer, "Argentina Looks to Reprocessing to Fill Its Own Needs Plus Plutonium Sales," Nuclear Fuel (8 November 1982), 3.

⁸² "Argentina Announces Delay of Controversial Plant," Nuclear News (March 1990), 70.

was not until October 1983, one week before the inauguration of President-elect Raúl Alfonsín, that CNEA revealed the Pilcaniyeu plant to the Argentine public. Alfonsín claims he did not know anything about this enrichment plant during his entire presidential campaign. An interview between Leonard Spector and Alfonsín in June 1990, shows that Alfonsín was "taken by surprise when the existence of the plant was announced just prior" to his inauguration.⁸³

The secrecy surrounding this enrichment facility raised suspicions that Argentina intended to build an atomic bomb. None of Argentina's power reactors (existing or planned) require enriched uranium. Only Argentine research reactors use small amounts of enriched uranium fuel. Table VII is a list of Argentina's current nuclear facilities.

⁸³ Spector, Nuclear Ambitions, 224.

Table VII
Argentina's Nuclear Infrastructure

Two operational power reactors

Atucha I (Heavy-water, 320 MWe, German supplier)

Embalse (Heavy-water, 600 MWe, Canadian supplier)

One power reactor under construction

Atucha II (Heavy-water, 745 MWe, German supplier)

Completion goal 1993

Seven research reactors [3 without IAEA safeguards]

One uranium enrichment plant

Pilcaniyeu [no IAEA safeguards]

(500 kg of 20% enriched uranium per year)

One plutonium extraction plant

Ezeiza [partial IAEA safeguards]

(15 kg of plutonium per year)

11,900 metric tons assured uranium reserves

Source: Leonard S. Spector, Nuclear Ambitions, 238-240.

In November 1983, Alfonsín became president after seven years of military rule. He replaced the head of the Argentine Nuclear Energy Commission (CNEA) Admiral Carlos Castro Madero with a civilian, Alberto Costantini. Alfonsín was embarrassed by the surprise announcement of the Pilcaniyeu enrichment plant and he wanted to place the CNEA under civilian control. This was the first of many steps to reverse the efforts of Argentine military to produce a nuclear weapon.

Argentina invested in its nuclear program since the early 1950s. Argentina had advanced indigenous nuclear capabilities while Brazil was almost completely dependent on U.S.-supplied technology. A paranoid competition in nuclear technology ensued between Argentina and Brazil during the late 1970s.

The nuclear rivalry intensified because of the political power of the military in each nation. Military governments conducted most nuclear research in secrecy. This veil of secrecy caused great suspicions, possibly greater suspicion than the actual progress of either nation's nuclear weapons programs would have otherwise warranted. The investments in nuclear weapons research continued in both nations during the 1980s. Brazil made considerable progress in matching the nuclear technology breakthroughs of its neighbor.

C. BRAZIL'S NUCLEAR PROGRAM

The first nuclear concerns of Brazil began in the early 1950s when Brazil asked an unresponsive United States to share nuclear technology with Brazil in return for uranium exports.⁸⁴ In 1956, the Brazilian government established the National Committee for Nuclear Energy (CNEN) and the Institute of Atomic Energy (IPEN). These agencies believed that Brazil's economic growth required nuclear power. The mission assigned to CNEN and IPEN was to develop indigenous nuclear capabilities.

⁸⁴ Solingen, "Brazil: Technology, Countertrade, and Nuclear Exports," 114.

However, the Brazilian scientific infrastructure was not as advanced as in Argentina and Brazil lacked the close ties with the European scientific community enjoyed by Argentina.⁸⁵ Brazil did have a close relationship with the United States following their cooperative efforts during World War II. Thus, Brazil became one of the first recipients of U.S. nuclear assistance under the Eisenhower "Atoms for Peace" program.

The Brazilian military has nuclear research programs independent of CNEN. Brazil has an official nuclear program under the state-owned Brazilian Nuclear Corporation (Nuclebrás) and "parallel" nuclear programs controlled by the Brazilian military. The "parallel" nuclear programs are also known collectively as the Autonomous Nuclear Technology Program (PATN) and run by the military-controlled National Nuclear Energy Commission (CNEN). Within the PATN, the Brazilian army, air force, and navy each have their own nuclear research program. Nuclear technology was, however, shared between Nuclebrás and the parallel program. The parallel program is a major proliferation concern because of its secrecy and use of unsafeguarded facilities.⁸⁶

Brazil built two nuclear research reactors and one power reactor with United States assistance under the "Atoms for Peace" program. The research reactors, **IEAR-1** in São Paulo and **Triga-UMG** in Belo Horizonte,

⁸⁵ Donnelly and Davis, "Argentina, Brazil, and Nuclear Proliferation," 5.

⁸⁶ Spector, Nuclear Ambitions, 243.

became operational in 1957 and 1960 respectively. All nuclear exports from the United States under the "Atoms for Peace" program required the supervision of the IAEA. Brazil adopted some of the lessons learned from IAER-1 and Triga-UMG and built its first indigenous research reactor (**REIN-1** in Rio De Janeiro). REIN-1 started operations in 1965. This research reactor used medium-enriched uranium supplied by the United States.⁸⁷ Since the U.S supplied the nuclear fuel, IAEA safeguards were required at REIN-1.

The Westinghouse Corporation began the construction of Brazil's first nuclear power plant in 1971. This deal with a U.S. firm was a subject of controversy because it did not include any transfer of technology.⁸⁸ This reactor used low-enriched uranium fuel. Under the terms of the contract, Brazil would remain dependent on external sources of enriched uranium because the U.S. would not transfer any uranium enrichment technology. This frustrated Brazil's military government and motivated it to seek nuclear technology from nations other than the United States.

Brazil was slowly developing an indigenous nuclear capability, but, the Brazilian military wanted faster progress. In 1974, Argentina's Atucha I power plant started operations and highlighted the gap between Argentine and Brazilian nuclear programs. Many Brazilians worried that Argentina

⁸⁷ Spector, Nuclear Ambitions, 262.

⁸⁸ Donnelly and Davis, "Argentina, Brazil, and Nuclear Proliferation," 5.

was obtaining the capability of building nuclear weapons. The Brazilian military was particularly distressed over the Argentine plutonium reprocessing plant at Ezeiza.

The construction of Brazil's first nuclear power reactor was a slow process fraught with cost overruns and delays. The **Angra I** power plant began to operate in 1982, but did not begin full commercial operations until 1987 because of technical difficulties.⁸⁹ The Brazilian disappointment over the progress of Angra I became part of a growing rift between Brazil and the United States during the late-1970s. The Carter administration's emphasis on human rights soured U.S. relations with the Brazilian military government. In 1977, Brazil broke its military assistance treaty with the United States because of President Carter's human rights linkages.

Brazil negotiated with West Germany for access to nuclear technologies that the U.S. refused to transfer. Brazil wanted uranium enrichment and plutonium reprocessing technologies. In 1975, Nuclebrás completed a mammoth nuclear transfer agreement with West Germany called the "Deal of the Century." It provided for the sale of eight 1,300-megawatt nuclear reactors, a pilot-scale plutonium reprocessing plant, and a commercial-scale uranium enrichment facility.⁹⁰ The West German government did not require full-scope IAEA safeguards as a condition for

⁸⁹ Potter, Ed., International Nuclear Trade, 112.

⁹⁰ Spector, Nuclear Ambitions, 243.

the transfer of sensitive nuclear technology. This allowed Brazil to share technology between its "parallel" research programs and the state-owned Nuclebrás corporation.

The technology obtained from West Germany allowed the indigenous nuclear programs of the PATN to advance at a more rapid pace. Brazil began building two secret uranium enrichment plants in 1983, one at the **Aramar Research Center** in Ipero and the other at the **IPEN** facility in São Paulo. In 1987, Brazil achieved a major breakthrough in centrifuge enrichment technology at the IPEN facility at the University of São Paulo. This breakthrough ensured Brazil access to weapons-grade uranium during the 1990s.⁹¹

By late 1988, the Ipero enrichment plant had 300 operating centrifuges. The estimated capacity of this facility could produce enough weapons-grade uranium for two to three weapons annually. According to a West German intelligence report, as early as 1987, Brazil had the ability to produce highly-enriched uranium.⁹² Brazil circumvented safeguards on West German technologies in order to use them in the unsafeguarded parallel program. The West German government protested to Brazil in 1987 that the Brazilian National Nuclear Energy Commission (CNEN) was

⁹¹ Spector, The Undeclared Bomb, 258.

⁹² Mark Hibbs, "Germans say Brazil Developing Two Production Reactors," Nucleonics Week (27 July 1989), 19.

siphoning off technicians from the safeguarded West German-Brazilian enrichment program, to work on the parallel program.⁹³

In 1985, financial problems and construction delays forced Brazil to curtail the purchase of nuclear reactors from West Germany. Brazil canceled plans to build any new nuclear reactors beyond the two power plants under construction at the time (**Angra II** and **Angra III**). Table VIII presents Brazil's nuclear facilities.

⁹³ Antonio Rubens Britto de Castro, Noberto Majlis, Luiz Pinguelli Rosa, and Fernando de Souza Barros, "Brazil's Nuclear Shakeup: Military Still in Control," The Bulletin of Atomic Scientists (Volume 45, Number 4, May 1989), 22-25.

Table VIII
Brazil's Nuclear Infrastructure

One operational power reactor

Angra I (Light-water, 626 MWe, U.S supplier)

Two power reactors under construction

Angra II (Light-water, 1300 MWe, German supplier)
 Completion goal 1992

Angra III (Light-water, 1300 MWe, German supplier)
 Completion goal 1995

Four research reactors

[One without IAEA safeguards]

Four uranium enrichment plants

[2 without IAEA safeguards]

Aramar Research Center, Ipero

IPEN, São Paulo

("several dozen kilograms" of 20% enriched uranium per year)

Two laboratory scale plutonium extraction plants

[1 with partial IAEA safeguards]

IPEN, São Paulo (5 kg of plutonium per year)

163,276 metric tons of assured uranium reserves

Source: Leonard S. Spector, Nuclear Ambitions, 260-261.

In 1988, Nuclebrás was dissolved and state utility, Electrobrás, took control of all nuclear power plant operations.⁹⁴ The 1988 reorganization was directed by the Sarney administration as a cost cutting measure and as

⁹⁴ Potter, Ed., International Nuclear Trade, 112.

part of a privatization program. This reorganization required civilian control over nuclear research that had been dominated by the military.

A new Brazilian Constitution was written in 1988 that allowed nuclear research for only peaceful purposes. The Brazilian military continued to operate many classified facilities even though the Constitution outlawed the use of nuclear technology for military purposes. A vivid example of the Brazilian military's secret efforts to build an atomic weapon was the discovery of a nuclear test site built in the Amazon. In September 1990, President Collor visited a 320-meter deep hole in Serra do Cachimbo built by Brazil's former military governments to test nuclear weapons. According to the Brazilian journal VEGA, this US\$1 million hole proved both the bellicose intentions of the military government and its irresponsible spending habits.⁹⁵ President Collor symbolically sealed the shaft and promised to end all secret nuclear research by the military.

Table IX provides a summary of the reasons why Argentina and Brazil have been suspected by the international community of trying to build nuclear weapons.

⁹⁵ "Militares: Acao tapa-buraco [Military: Operation Fill the Holes]," (in Portuguese), VEGA, 26 September 1990, translated and reported by INFO-SOUTH, (9 November 1990).

Table IX

A Summary of Argentine and Brazilian Progress towards Building an Atomic Weapon

- a. Ample uranium resources
- b. Sophisticated scientific community
(European connections)
- c. Large nuclear energy infrastructure
(nuclear fuel cycle complete)
- d. Refusal to sign NPT nor comply with
the Treaty of Tlatelolco
- e. Clandestine and unsafeguarded
nuclear facilities
- f. Delivery systems for nuclear weapons
available (Condor II in Argentina
and Orbita in Brazil)

Argentina and Brazil have the nuclear expertise to build a nuclear weapon before the end of the century. The decision to build a nuclear weapon, however, requires substantial financial backing that neither economy could easily support. It would be difficult for the democratic governments in Argentina and Brazil to justify such an expense to their publics.

In August 1991, the Brazilian public learned that US\$65 million in a secret fund was used for nuclear projects by the by the Strategic Affairs Secretariat (SAE).⁹⁶ This secret fund purchased centrifuge machinery at

⁹⁶ "Poco sem fundo [Bottomless Pit]," (in Portuguese), ISTOE SENHOR, 14 August 1991, translated and reported in INFO-SOUTH (7 September 1991). The Strategic Affairs Secretariat (SAE) is the Brazilian equivalent to the National Security Council in the United States.

the Ipero enrichment plant.⁹⁷ The existence of this fund casts doubt on the promises made by Collor in the Guadalajara Accord. It questions Collor's true intentions regarding nuclear weapons, and it shows the danger of military insubordination in a fledgling democracy. If nuclear weapons are developed during the 1990s in either nation, it will likely be through defiant military programs. Therefore, the only way to ensure that these nations do not produce nuclear weapons will be the establishment of civilian supremacy over the military.

Leonard Spector warns that "Argentina and Brazil are primed to cross the nuclear threshold if political winds should shift."⁹⁸ Full-scope IAEA safeguards are the best protection against nuclear proliferation "political winds" change. The next chapter will provide a history of the rivalry between Argentina and Brazil to explain why a nuclear competition escalated between these nations.

⁹⁷ "Uma verba atomica [An Atomic Fund]," (in Portuguese), VEGA, 14 August 1991, translated and reported by INFO-SOUTH (20 September 1991).

⁹⁸ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 37.

VI. HISTORY OF ARGENTINE-BRAZILIAN RIVALRY

The struggle for influence between Argentina and Brazil is the oldest of all Latin American conflicts. It can be traced back to the Treaty of Tordesillas in 1494 which divided the New World between the Spanish and Portuguese kingdoms.⁹⁹ The cultural differences between the Spanish in Argentina and Portuguese in Brazil have been a constant source of tension in Latin America. A declared war between Argentina and Brazil has never occurred. However, armed confrontations arose on several occasions.

The first military clash occurred over the "Banda Oriental" region in Uruguay (1825-1828). Later, Brazil used armed incursions into Argentine territory in an attempt to bring down Argentine dictator, Juan Manuel Rosas, in the early 1850s. Argentina and Brazil were allies in a "marriage of convenience" against Paraguay during the 1865-1870 War of the Triple Alliance. Despite being allies, violent confrontations between the Argentine and Brazilian militaries erupted in Paraguay during this war. A series of minor confrontations over borders continued into the twentieth century.¹⁰⁰

⁹⁹ Stanley J. Stein, The Colonial Heritage of Latin America (New York: Oxford University Press, 1970), 3-27.

¹⁰⁰ Jack Child, Geopolitics and Conflicts in Latin America: Quarrels Among Neighbors (New York: Praeger, 1984), 101.

The Argentina and Brazil have a history of competition for the leadership of the South American continent. Many Argentines believe that their Brazilian neighbors are unsophisticated and barbaric. A comparison between Argentina and Brazil is often made using the differences between their national dances: the tango and the samba. The tango is a metaphor to explain the sense of refinement and sophistication in Argentina.¹⁰¹ The samba expresses the raw passion and energy in the large Brazilian republic.¹⁰²

The Argentine sense of superiority over Brazil is rooted in its cultural and intellectual traditions. Argentine history is full with articulate intellectuals espousing the virtues of modernization and technology. It has maintained close cultural ties with Europeans. Argentine literature praises the need for technology and material progress to achieve a destiny left by their European ancestors. In the mid-1800s, authors like Domingo Sarmiento and José Mármol were instrumental in directing Argentine development. Sarmiento wrote Civilization and Barbarism in 1845 and Mármol wrote Amalia in 1855.¹⁰³ These influential books are an example of the importance of modernization and progress in the Argentine tradition.

¹⁰¹ Cristina Bonasegna, "Buenos Aires: Cosmopolitan, Contradictory, Passionate," The Christian Science Monitor (27 June 1991), 10-11.

¹⁰² Amy Duncan, "Samba: Soul of Carnival," The Christian Science Monitor (25 October 1990), 10-11.

¹⁰³ E. Bradford Burns, Latin America (Englewood Cliffs, NJ: Prentice Hall, 1990), 90.

Thus, Argentina believes itself to be the leader in Latin America because of its social, cultural and scientific achievements.

In contrast to Argentina, Brazil's perception of Latin American leadership results from its massive size. Brazil's aspiration to regional leadership has been analyzed extensively.¹⁰⁴ The Brazilian faith in national "greatness" on the Latin American continent can be compared with the United States belief in Manifest Destiny. Brazil, like the United States in the 19th century, believes it will to evolve into a world power. Brazil has expressed interest in negotiating a commercial outlet to the Pacific and has placed a high priority on using the vast commercial potential of the Amazon.

Some Brazilian geopolitical writers claim that a coming age of a Pax Brasiliana will replace the declining Pax Americana. Brazil believes itself to be the "Colossus of the South" that will fulfill its destiny by becoming the first world power to emerge from the southern hemisphere. The economic crisis of the 1980s has quieted the champions of Brazilian greatness. However, nationalism continues to be a powerful political force. Jack Child

¹⁰⁴ Analysis of Brazilian desires for international status may be found in Riordan Roett, "Brazil and the United States," Journal of Interamerican Studies and World Affairs (Volume 27, Number 1, 1985), 1-17 and Wayne Selcher, Ed., Brazil in the International System: The Rise of a Middle Power (Boulder, CO: Westview Press, 1981).

argues that "Brazil's path to greatness is seen as a distinct threat by most Argentines."¹⁰⁵

Brazil cooperated closely with the United States from World War II until the late 1970s. The goal of Brazilian cooperation with the United States was to obtain essential foreign investment and technology in order to build a first-class economy. The pro-U.S. alignment of Brazil received the scorn of the other South American nations that were distancing themselves from the United States during the 1960s. Argentina had bitter foreign relations with Brazil (and Chile). Argentina thought it was threatened by a conspiracy of its neighbors. The Argentine military resented the U.S. cooperation with Brazil because its qualitative advantage over the Brazilian military slowly eroded.

When Brazilian relations with the United States soured during the Carter administration, Brazil's relations with its Latin American neighbors improved. Brazil no longer appeared to be a U.S. proxy. Brazil began to emphasize South-South economic and political relations and improved its relations with Argentina. In 1979, General Figueiredo became the first Brazilian president to visit Buenos Aires in 45 years.¹⁰⁶ Jack Child notes

¹⁰⁵ Jack Child, "The Status of South American Geopolitical Thinking," in G. Pope Atkins, Ed., South America Into The 1990s: Evolving International Relationships In A New Era (Boulder, CO: Westview Press, 1990), 62.

¹⁰⁶ Wayne A. Selcher, "Brazil and the Southern Cone Subsystem," in G. Pope Atkins, Ed., South America Into The 1990s, 94.

that "the loosening of traditional United States-Brazilian ties permitted the unprecedented strengthening of Argentine-Brazilian links."¹⁰⁷

The roller coaster of Argentine-Brazilian relations, however, continued during the 1980s, primarily because of the Falklands War. The failure of Brazil (and especially Chile) to side enthusiastically with Argentina during the Falklands War renewed Argentina's suspicions of its neighbors. The Argentine military feared that Brazil might take advantage of the turmoil following the defeat in the Falklands to attack Argentina.¹⁰⁸ The sense of isolation felt by Argentina during the Falklands War fueled the desire to build an atomic weapon.

A. ARGENTINE-BRAZILIAN NUCLEAR COMPETITION

The nuclear aspect of the Argentine-Brazilian rivalry poses disturbing questions because both countries are "threshold nations" capable of developing a nuclear weapon before the end of this decade. Neither nation has faced an external threat that might arguably call for the development of a nuclear deterrent.¹⁰⁹ The interests in acquiring nuclear technology were for reasons of national pride and to satisfy energy needs. A nuclear arms race began because both viewed nuclear development to be an important factor in their enduring competition for regional preeminence. At a

¹⁰⁷ Child, "The Status of Geopolitical Thinking," 60.

¹⁰⁸ Child, "The Status of Geopolitical Thinking," 62.

¹⁰⁹ Donnelly and Davis, "Argentina, Brazil, and Nuclear Proliferation," 2.

minimum, neither could afford to fall behind the other in the development of nuclear weapons.

Argentina and Brazil are not members to the NPT. President Collor expressed Brazil's reasons for not becoming a member of the NPT as follows (Argentina has similar reasons for refusing to sign the NPT):

Brazil did not sign the Non-Proliferation Treaty because it creates difficulties for access to technology...the NPT is a straightjacket that would hinder our access to new forms of technology that are fundamental to the prosperity of Brazil.¹¹⁰

Collor's view on the NPT is not universally accepted in Brazil. Former Brazilian Senator Roberto Campos claimed Collor's interpretation of the NPT is wrong. According to Campos, when Brazil refused to sign the NPT, it unleashed widespread suspicions about Brazilian nuclear intentions. This caused international restrictions on Brazilian acquisition of nuclear technology. Instead of reaching technological autonomy by rejecting the NPT, Brazil embarked on a path of technological isolation (from the United States).¹¹¹

¹¹⁰ "Collor Views the NPT," (in Spanish), EXCELSIOR, 16 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-148, 1 August 1991), 32-38.

¹¹¹ Roberto Campos, "Os orfaos da historia [The Orphans of History]," (in Portuguese), ESTADO DE SÃO PAULO, 17 September 1989, translated and reported by INFO-SOUTH (10 October 1990).

European countries catered to the Argentine-Brazilian desire to obtain nuclear technology and refused to follow the technology transfer restrictions desired by the United States. The major Western European powers have competed in the highly lucrative trade of selling nuclear technology for "peaceful" purposes to Argentina and Brazil. While there are restraints on the proliferation of nuclear technology for peaceful purposes, they are often vague and uncertain. As a result, nuclear energy programs can be pursued that, while ostensibly for peaceful purposes, have at least a partial military application.¹¹²

B. DECLINE OF MILITARY TENSIONS

The reduction in military tension began during the mid-1980s. Evidence of the decreased military tensions between Argentina and Brazil can be drawn from the four following developments.

First, the Argentine armed forces will reduce their troop strength by 30% by the year 2000. A plan submitted to President Menem by Defense Minister Antonio Erman Gonzalez will cut the Argentine armed forces from the current level of 95,000 troops to approximately 65,000 troops.¹¹³ The Brazilian armed forces will also undergo significant reductions from their current size of 320,000 troops, but the percentages to be cut have not been

¹¹² Morris, Controlling Latin American Conflicts, 120.

¹¹³ "Armed Forces to Reduce, Sell Property," (in Spanish), MADRID EFE, 17 August 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-160, 19 August 1991), 15.

announced.¹¹⁴ Second, in August 1991, Argentine President Menem, Brazilian President Collor and Chilean President Patricio Aylwin signed a commitment to ban chemical and biological weapons from their countries.¹¹⁵ Third, the nuclear agreement signed with Brazil during the Guadalajara summit in July 1991 includes confidence-building measures that will reduce suspicion and distrust. The mutual inspections established by the Guadalajara Accord open many previously classified military installations. The rapprochement between Argentina and Brazil is understandable because neither state would want to start a costly arms race.¹¹⁶

The cooperation displayed in arms control and international agreements offers proof that their historical rivalry between Argentina and Brazil may have ended. The most compelling evidence that the military rivalry between Argentina and Brazil has ended is the increasing integration of their economies. The steps being taken towards a common economic market between Argentina, Brazil, Chile and Uruguay appear to be ushering in a new era in international cooperation in South America.

¹¹⁴ "Brazil: Hot Brass," The Economist (6 July 1991), 42.

¹¹⁵ "Collor assina acordo com Menem sobre arma quimica, [Collor Signs Agreement with Menem about Chemical Weapons]," (in Portuguese), FOLHA DE SÃO PAULO, 20 August 1991, translated and reported by INFO-SOUTH (13 September 1991).

¹¹⁶ Morris, Controlling Latin American Conflicts, 117.

The reduced tensions between Argentina and Brazil make the formation of the Southern Cone Common Market (Mercosur) possible. The principle of free market capitalism has replaced the statist economic policies that ran the Latin American economies into bankruptcy during the late 1970s and 1980s.¹¹⁷ The "lost decade" of the 1980s caused an overall decline in GNP and standards of living. The end of the Argentine-Brazilian rivalry could produce an important "peace dividend" because of reduced defense spending and increased trade.

Under the Mercosur common market, Argentina and Brazil will reduce tariffs by 20% a year beginning in 1990, reaching zero tariffs by 1994. President Collor called Mercosur "the starting point for overcoming the effects of economic recession, of technological inadequacies, and of social backwardness in our countries."¹¹⁸

Mercosur will provide a stepping stone in the eventual completion of the Enterprise of the Americas Initiative (EAI) announced by President Bush in June 1990. The EAI promises to make a common economic market

¹¹⁷ An interesting comparison between the economic problems occurring in the Soviet Union and Latin America is made in Julia Michaels, "Will the Soviets Learn a Latin Lesson?" The Christian Science Monitor (23 August 1991), 6.

¹¹⁸ "Brazil and Partners Launch Mercosur," Latin American Regional Reports: Brazil Report (RB-91-04, 2 May 1991), 8.

from Alaska to Argentina.¹¹⁹ President Bush wants regional economic markets established before integration with the U.S. market can be completed. Therefore, the end to the rivalry between Argentina and Brazil is an essential step towards the eventual establishment of a hemispheric common market.

¹¹⁹ U.S. House of Representatives, Committee on Foreign Affairs, The Enterprise For The Americas Initiative (101st Congress, 2nd Session, 27 September 1990).

VII. DEMOCRATIZATION AND 'DENUCLEARIZATION'

This chapter addresses the relationship between the growth of democracy and decline in nuclear weapons research programs in Argentina and Brazil. Civilian leaders in both nations terminated secret programs begun by the preceding military governments. Most funding for clandestine nuclear programs was cut by the civilian presidents in both nations. In the 1991 Guadalajara Accord, Presidents Menem and Collor stated that the pursuit of nuclear weapons was a wasteful adventure that must be stopped. The return of democratic rule improved relations between Argentina and Brazil. The civilian leadership took steps to reduced the suspicions that justified investments in nuclear weapons made by the past military governments.

The consolidation of democracy in Argentina and Brazil is not complete. The civilian leaders are confronted with the difficult task of redefining the role of the military. In general, Latin American nations have a historical cycle of military interventions. The political strengths of the military often made it the most effective institution in Argentina and

Brazil.¹²⁰ Figure 3 illustrates the cyclical nature of military coups common to Latin America.¹²¹

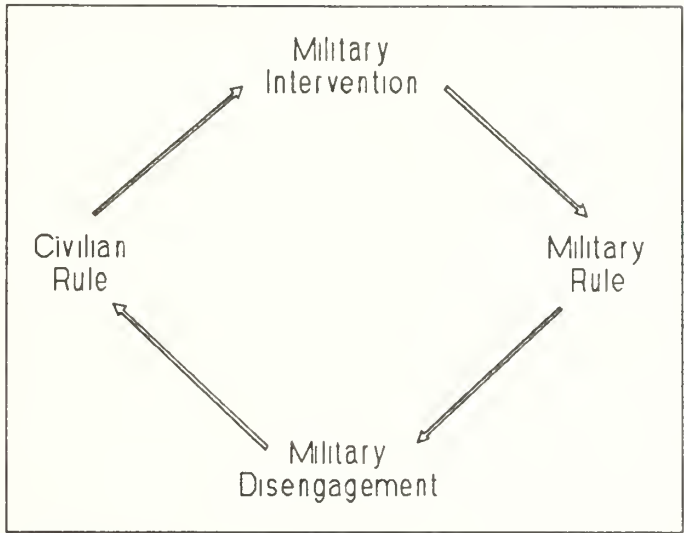


Figure 3
Cycle of Military Intervention

Argentina has experienced six military coups since 1930. The last military regime took power in 1976 and ruled Argentina until Raúl Alfonsín was elected in 1983. Unsuccessful Argentine military uprisings recently

¹²⁰ The centralized command structure, organization, and military virtues of the armed forces are political strengths that civilian political institutions in Latin America often lacked. The political weaknesses of the military result from inadequate techno-bureaucratic skills, over-reliance on structure, and most important, a lack of legitimacy to rule the society. See Samuel E. Finer, The Man on Horseback: The Role of the Military in Politics (London: Pall Mall Press, 1962), 11.

¹²¹ Monte Palmer, Dilemmas of Political Development (Itasca: Peacock Publishers, 1989), Chapter 6.

occurred in 1987 and 1990.¹²² Brazilian history differs from this cycle of military intervention because its armed forces refused to rule the nation directly until the 1964 military coup. The Brazilian military did, however, rule the nation from 1964 until 1985.

Military coups often result because of a combination of factors that "pull" and/or "push" the armed forces into politics.¹²³ Military coups are often invited by instability in the civilian government. The middle class encourages (or pulls) the military to take over the government to return law and order. On the other hand, different influences arise within the armed forces causing the military to "push" itself into politics. Military leaders want to take over the government to protect against leftist insurgencies or to secure larger defense budgets. When a military takes control of the government it soon finds that the inherent contradictions of military rule threaten the institution of the armed forces. The "military as an institution" becomes endangered by the role of "military as government."¹²⁴

¹²² Julia Michaels, "Argentina Reassess Military Role," The Christian Science Monitor (16 July 1991), 6.

¹²³ The term "overt intervention" by the military into politics is used by Abraham F. Lowenthal, and J. Samuel Fitch, Armies and Politics in Latin America (New York: Holmes & Meier, 1988), Chapter 1.

¹²⁴ Alfred Stepan, Rethinking Military Politics: Brazil and the Southern Cone (Princeton: Princeton University Press, 1985), 6.

A. REASONS FOR THE RETURN OF CIVILIAN RULE

The Argentine and Brazilian militaries withdrew from control of the government during the 1980s in an effort to maintain the integrity of the armed forces. The institution of the armed forces is focused on the organizational, structural, and prestige needs of the military.

The performance of the military government affects the popular perceptions of the entire military. Mismanagement by the military government leads to a dramatic loss of prestige for the institution of the armed forces. Eventually, military leaders see the need to narrow the concerns of the military to the needs of the armed forces institution, not running the entire government. This leads to the military's eventual disengagement from politics.

The economic problems confronting Argentina and Brazil motivated the military to disengage from politics and encouraged the return to civilian rule during the 1980s. The international debt crisis inspired the military to retreat from governing because the astronomical debt service payments consuming the national budget. Simplistically stated, the military desired to get "back to basics" by leaving government to civilians and concentrating on the individual needs of the armed forces.

The Brazilian people traditionally admired the military, but the tales of corruption and incompetence tarnished the military's reputation. The Argentine military was disgraced by the defeat in the Falklands war. The

institutional needs of the armed forces required the return of political power to civilians. The military would take a back seat to civilian presidents, but still held considerable influence from behind the scenes.

The armed forces thought they could have the best of both worlds, leaving the government, but still retaining the prerogatives of power enjoyed while ruling the nation. Some of the prerogatives retained by the Argentine and Brazilian militaries were control over the military budget, regular pay raises, and an active duty membership in the civilian president's Cabinet.

A problem for the military arose because the liberalization increased the strength of political opposition movements in the early 1980s. Thomas Bruneau declared that "the initial opening stimulated the rebirth of civil society."¹²⁵ The military could no longer control the liberalization process. Liberalization began as an effort to stabilize authoritarian rule and may not have originally intended to evolve into full democratization. This liberalization strengthened opposition to the military government, and the pressures for the return to democratic civilian rule increased beyond the expectations of the military government.¹²⁶

¹²⁵ Thomas Bruneau, "Brazil", in John Higley and Richard Gunther, Eds., Elites and Democratic Consolidation in Latin America and Southern Europe (Austin: Univ. of Texas, forthcoming-1991), 9.

¹²⁶ John Orme, "Dismounting the Tiger: Lessons from Four Liberalizations," Political Science Quarterly (Volume 103, Number 2, Summer 1988), 245-265.

The people of Argentina elected Raúl Alfonsín as president in 1983 to replace the military government of General Galtieri who was disgraced by the Falklands War. In 1985, Brazil elected a civilian president, Tancredo Neves, (with José Sarney as Vice President) marking the end to Brazilian military rule.¹²⁷

The military in both nations still retained many prerogatives during the 1980s. But the reins of political power were no longer monopolized by the military. Alfred Stepan in Rethinking Military Politics, has an outstanding analysis of the changing military prerogatives in Argentina and Brazil. Figure 4 provides an updated version of chart used by Stepan to show the trends in declining prerogatives and increasing contestation by the armed force in both nations.

¹²⁷ José Sarney assumed the Presidency because of the unexpected illness and death of Tancredo Neves in 1985. The military allowed Sarney to rise from vice president to president, even though rumors of a return to military rule were widespread.

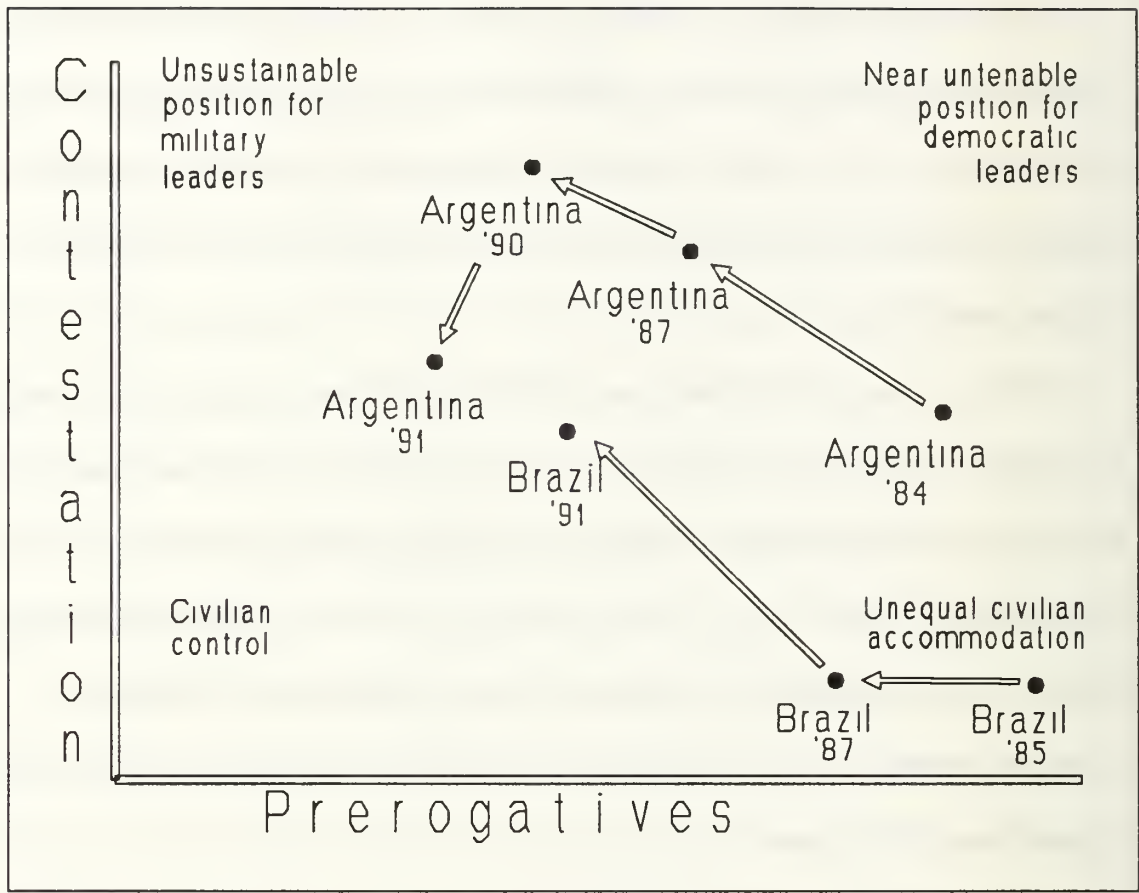


Figure 4
Updated Version of Alfred Stepan's Analysis on Military Prerogatives in Argentina and Brazil

The civilian governments in both Argentina and Brazil have experienced increased contestation from their respective militaries since 1985. The high points of conflict between the Argentine military and the government occurred during the 1987 Easter week mutinies¹²⁸ and the

¹²⁸ Stepan, *Rethinking Military Politics*, 122.

failed December 1990 military coup.¹²⁹ The Argentine military is under firmer civilian control since this failed coup. The rising contestation between the government and military in Brazil has surrounded the issues of low military pay and declining budgets.¹³⁰

The popularity of the Argentine military has diminished because of its past human rights abuses. The defense budget was reduced in 1991 to less than 1.4 percent of GNP.¹³¹ In 1987, Argentina's military budget was over 3.3 percent of GNP.¹³² President Menem succeeded Alfonsín in 1989 and continued to reduce the political power of the military. Not only did Menem reduce the defense budget, he discontinued the prestigious ballistic missile program.

On 3 June 1991, Menem called for all parts of the Condor II missile project to be deactivated and dismantled. The Argentine air force sees the end of the Condor II missile program as a major blow to its prestige.

Menem's rapprochement with Brazil is causing discontent among senior

¹²⁹ "Fact Sheet: The President's Trip to Argentina," U.S. Department of State Dispatch (10 December 1990), 326, and Christina Bonasegna, "Argentine Revolt Reveals Lingering Army Tensions," The Christian Science Monitor (5 December 1990), 1.

¹³⁰ James Brooke, "Free Falling Salaries' Anger Brazil's Military," The New York Times (6 December 1990), A4.

¹³¹ Julia Michaels, "Argentina Reassesses Military Role," The Christian Science Monitor (16 July 1991), 6.

¹³² Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers - 1987 (Washington: U.S. Government Printing Office, 1988), 32.

military officers. The Argentine military distrusts Brazil and does not want to open its more advanced nuclear program to Brazil. Retired Air Force General Ernesto Crespo said that "Argentina will become a banana republic if it allows another nation to decide the future of the Condor II [referring to the United States]."¹³³ This is an example of the growing discontent in the Argentine military, but it also shows the decline in the political power of the armed forces.

In Brazil, President Collor had a series of serious confrontations with powerful generals soon after his inauguration. In his inaugural statement, Collor claimed to have "a silver bullet" capable of "killing inflation." Following the speech, retired General Newton Cruz insulted the President by saying that "a statesman with only one bullet in his revolver should use it against his own head."¹³⁴ Collor punished Newton Cruz with a 10-day arrest for the insult. This punishment had repercussions throughout the military. It showed that Collor was willing and able to confront the military, and demonstrated the growing power of the civilian presidency.

Financial problems trouble the Brazilian military. Shortages of munitions, obsolete weaponry, a lack of uniforms, rationed food, and low

¹³³ "Argentina Condor Missile," Latin American Regional Reports: Southern Cone Report (RS-91-05, 7 July 1991), 2.

¹³⁴ "Collor Has Public Clash With Generals", Latin American Regional Reports Brazil (RB-90-04, 3 May 1990), 6.

pay are now the main features of the Brazilian Armed forces.¹³⁵

Discontent exists at all ranks of the Brazilian military. The issue of military salaries and pensions being eroded by inflation became a springboard that launched many retired military men into politics. The revival of the Clube Militar (Military Club) with its history of considerable political influence is a mouthpiece for conservatives to support for the military. The Military Club was an active political force before the 1964 coup. On 5 December 1990, the 25,000 member Military Club sought an injunction from the Supreme Court to improve military pay. Due to inflation, an army general now earns \$19,000 a year while a Congressman earns \$54,000 a year.¹³⁶

In June 1991, the Brazilian Congress denied the military a 20% pay raise, while at the same time granting congressional employees a 36% pay increase. President Collor openly condemned the vote by Congress and sided with the military on this issue. A small pay raise was finally given to the military in the fall. This is one example of how rising military contestation is destabilizing Brazil's democracy. It will be difficult to consolidate democratic rule in such a strained environment. Unfortunately, the tensions appear likely to continue.¹³⁷

¹³⁵ "Military Frustrated by Lack of Funds," Latin American Regional Reports: Brazil Report (RB-91-06, 11 July 1991), 4-5.

¹³⁶ James Brooke, "Free Falling Salaries Anger Brazil's Military", The New York Times (6 December 1990), A4.

¹³⁷ James Brooke, "Brazil's President Backs Army Over Congress," The New York Times (4 August 1991), A17.

B. PROCESS OF NUCLEAR RAPPROCHEMENT

Until the mid-1980s, the armed forces in both Argentina and Brazil had considerable autonomy over nuclear facilities. The nuclear rapprochement between Argentina and Brazil accelerated once civilian presidents replaced the military governments.

In 1985, the President Alfonsín reversed the nuclear policy of the preceding military government when he declared that Argentina would require IAEA safeguards for all nuclear exports from Argentina. In November 1985, at Foz de Iguacu, on the Brazil-Argentina border, Alfonsín met with Brazilian President Sarney, to sign a bilateral accords that included a joint declaration on nuclear policy. The declaration stressed the importance of nuclear research for only peaceful purposes.¹³⁸

In March 1986, a joint Argentine-Brazilian nuclear commission agreed on the concept of mutual inspections, but insisted that any such system would be independent of the IAEA. Any international inspections, especially IAEA safeguards, were considered to be an infringement of Argentine and Brazilian sovereignty. On 28 April 1986, a nuclear accident occurred at the Chernobyl reactor in the Soviet Union. Presidents' Alfonsín and Sarney agreed to create an early warning system to notify each other in case of a similar accident.¹³⁹

¹³⁸ Spector, Nuclear Ambitions, 226.

¹³⁹ Spector, Nuclear Ambitions, 225.

A series of confidence-building visits to nuclear facilities was used to eliminate suspicions between Argentina and Brazil. In December 1986, Argentine nuclear specialists visited Brazil's classified nuclear research center at the Institute for Nuclear and Energy Research (IPEN) at University of São Paulo. The facilities visited included an experimental centrifuge enrichment unit and a laboratory-scale plutonium extraction facility, neither of which was subject to IAEA safeguards. In July 1987, President Sarney toured the Pilcaniyeu enrichment plant.

Sarney visited Buenos Aires for a fifth summit with Alfonsín in November 1988. Sarney visited the plutonium extraction plant at Ezeiza. They signed another joint declaration on the peaceful use of nuclear energy.

President Menem was inaugurated in the spring of 1989. He took action to place all Argentine nuclear programs under civilian control. In July 1989, Menem named a civilian, Dr. Manuel Mondino, to become Chairman of the CNEA. Menem overlooked Admiral Carlos Castro Madero who had greater experience and was a ranking member in his Peronist party. In March 1990, work on the Ezeiza plutonium extraction plant was indefinitely frozen because the "project was no longer a priority" according to CNEA Chairman Mondino.¹⁴⁰

Collor became Brazil's president in March 1990. He named José Goldemberg as Secretary of Science and Technology to control the nation's

¹⁴⁰ Spector, Nuclear Ambitions, 232.

nuclear programs. Goldemberg was a well-known critic of the "parallel" nuclear programs. Collor set a priority goal to establish complete civilian control over all nuclear research. He demanded an end to all secret "parallel" programs. The last secret nuclear program became public on 9 November 1990, when a commission of national deputies and scientists of the Congressional Investigative Committee (CPI) inspected an Army nuclear laboratory in Rio de Janeiro. The Army secretly conducted research on the 25 square-kilometer facility since 1986. The goal of the CPI is to enforce civilian oversight of all nuclear research.¹⁴¹

In November 1990, Presidents Collor and Menem met in Foz do Iguacu, Brazil, to sign an agreement promising to end all secret nuclear research. The agreement claims that the nuclear rivalry between Argentina and Brazil could be overcome through the sharing of technology and firm commitments against nuclear weapons. This agreement was signed before President Bush's visit to the region in December 1990. This pact formally reversed years of secret efforts to build a nuclear bomb. The Guadalajara agreement continued the process begun at Foz do Iguacu. It marks an

¹⁴¹ "Commission Visits Army Nuclear Complex", (in Portuguese), O Globo, 19 July 1990, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-90-120, 23 July 1990), 64.

important step towards completing the Latin American nuclear weapons-free zone conceived in the Treaty of Tlatelolco.¹⁴²

The Argentine and Brazilian militaries became disgruntled with their fall from power during the 1980s. The aborted coup in Argentina on 3 December 1990, showed the fragile nature of democracy.¹⁴³ The power of civilian governments is increasing in both nations. The fact that military budgets can be cut and the prestigious Condor II can be abandoned shows the growing strength of civilian leadership. Nuclear weapons programs were a high priority for the military governments of the 1980s, but they were never a higher priority than adequate pay and increasing military budgets. The Argentine and Brazilian militaries are confronted with declining budgets. The opposition to ending nuclear weapons research exists, but concern over pay and promotions is a far greater concern. The possibility of a military coup does exist. "No one in Argentina can guarantee there will be no other military uprising."¹⁴⁴ Even if this does occur, the primary reason will be due to issues of pay and promotions. It is unlikely that the military would invest heavily in nuclear weapons research because of the costs involved.

¹⁴² "Brazil and Argentina Ban the Bomb," The New York Times (5 December 1990), A19.

¹⁴³ James Brooke, "Debt and Democracy," The New York Times (4 December 1990), A6.

¹⁴⁴ Michaels, "Argentina Reassesses Military Role," 6.

Argentina cannot even afford to keep its nuclear power plants operating. The Argentine National Atomic Energy Commission (CNEA) has a debt of more than \$20 million with a local enterprise that provides nuclear reactor fuel. The financial trouble of the CNEA makes it unable to pay its suppliers. This may cause the seven nuclear reactors in Argentina that produce 900 megawatts of electricity to close down.¹⁴⁵ The nuclear weapons programs are far too expensive for the uncertain return that they could bring to the society. The Atucha I and Embalse power plants have experienced technical difficulties and maintenance problems. In late 1987, both nuclear power plants had technical problems that caused blackouts in Buenos Aires. In August 1988, the Atucha I reactor malfunctioned and was out of operation until January 1990. While Atucha I was out of commission, the Embalse reactor shutdown in December 1988 causing nationwide power outages. The Argentine government declared a state of emergency. The nation's electrical system ran under emergency procedures for several days. A nationwide debate on energy policy ensued that exhibited a distrust of nuclear power.¹⁴⁶

¹⁴⁵ There exists the possibility that CNEA is exaggerating its financial troubles as a bureaucratic ploy to obtain larger budget commitments from the Menem administration. "Nuclear Plants Could Close Due to Lack of Fuel," (in Spanish), NOTICIAS ARGENTINAS, 26 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-145, 29 July 1991), 29.

¹⁴⁶ "Energy Crisis Heightened," (in Spanish), NACION, 28 December 1988, translated and reported by INFO-SOUTH (22 March 1989).

During the 1980s, the international community (and the United States in particular) began limit Argentine and Brazilian access to dual-use technology because of their pursuit of nuclear weapons. The civilian government in Argentina and Brazil were force to examine the costs and benefits of investments in nuclear weapons research. It appears that civilian leadership decided that the costs of pursuing nuclear weapons exceeded the potential benefits of ever acquiring one. Therefore, the civilian governments will no longer support the expense of pursuing these weapons programs.

The civilian leaders in Argentina and Brazil realized that they must change the nuclear policies of past military governments, if they are going to become the First World nations. Neither country could afford to lose access to U.S. and Western European technology. The following statement by President Collor expresses the importance of technology in the post-cold war world.

The end of the cold war brings a new kind of bipolarity that will divide the world between rich developed nations-owners of both capital and technology and those other nations that lack capital and access to advanced knowledge, will be unable to change their tragic social status quo.¹⁴⁷

¹⁴⁷ "Collor on Nuclear Treaty," Foreign Broadcast Information Service (FBIS-LAT-91-139, 19 July 1991), 25.

In summary, the increased strength of democratic rule speeded the process of nuclear rapprochement between Argentina and Brazil. Table X summarizes the potential benefits of "denuclearization."

Table X

Potential Benefits of Abandoning Nuclear Weapons Development in Argentina and Brazil

- | |
|---|
| <ul style="list-style-type: none">a. Receive economic rewards from the international community, such as:<ul style="list-style-type: none">- The Enterprise of the Americas Initiative- Access to technology & investment- Debt restructuring and new loans (Brady Plan)b. Complete the process of regional economic integration begun in the Southern Cone Common Market (Mercosur).c. Establish civilian supremacy over the armed forces in an area where past military prerogatives existed.d. Build an advanced technological base and a more prosperous economy with the potential ability to renew nuclear weapons research in a few years, if the political situation changes. |
|---|

The declared end of nuclear weapons research in Argentina and Brazil is a positive step in global nonproliferation. Table XI presents some of the costs for Argentina and Brazil involved in ending nuclear weapons programs.

Table XI

Potential Costs of Abandoning Nuclear Weapons Development in Argentina and Brazil

- | | |
|----|---|
| a. | Perceived loss of national autonomy and sovereignty, making the government a target for nationalistic opposition movements. |
| b. | Additional confrontation between civilian government and the military (increased possibility of a coup?) |
| c. | Forfeiture of a potentially lucrative export market in nuclear and ballistic missile technology. |

When one compares the costs and benefits presented in Tables X and XI, it appears prudent for the civilian leaders to end the pursuit of nuclear weapons. Argentine and Brazilian leaders hope that the decision to end nuclear weapons pursuits will produce an economic windfall for their nations. It is as if they expect the Guadalajara Accord to provide each nation with increased access to technology, reduce government deficits, and expand trade between their nations. The next chapter examines the strengths and weaknesses of the Guadalajara agreement.

VIII. THE GUADALAJARA ACCORD

The Guadalajara Accord is the latest stage in the tradition of confidence-building measures begun in 1985 at Foz de Iguacu by Presidents Alfonsín and Sarney. It continues the spirit of cooperation started by the reciprocal visits to classified nuclear facilities. These visits by Brazilian President Sarney to Pilcaniyeu uranium enrichment plant in July 1987, and the April 1988 by Argentine President Alfonsín to Brazil's enrichment facility at IPEN. Spector notes that "unfortunately, these confidence-building initiatives do not permit either country to monitor the quantities and enrichment level of uranium produced at these plants."¹⁴⁸

A. STRENGTHS OF THE GUADALAJARA ACCORD

The history of nuclear rapprochement preceding the Guadalajara Accord provides for the major strength of this agreement. Before the signing of this agreement, there existed ample evidence of the efforts made in both nations to end nuclear weapons research. U.S. Ambassador-at-large Richard Kennedy met with President Menem in May 1990. He reported that "there is little if any cause for suspicion" that Argentina is using its nuclear program for belligerent purposes. In late June 1991, Argentine Defense Minister Antonio Erman Gonzalez met with U.S. Secretary of Defense Dick

¹⁴⁸ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 43.

Cheney. Gonzalez claimed that Argentina has no intention of participating in a nuclear arms race nor has any intention of acquiring other "mass destruction" weapons.¹⁴⁹

Evidence of Argentina's commitment to end its efforts to produce nuclear weapons research continues to be seen since the Guadalajara agreement. In August 1991, Vice President Danforth Quayle visited Argentina to expressed thanks for their participation in the Persian Gulf conflict. Quayle said the Argentine decision to abolish the Condor II project and to sign the Guadalajara Accord will improve U.S.-Argentine relations. Menem guaranteed Quayle that all advanced technology "will remain exclusively subordinated to civilian power."¹⁵⁰

The Brazil's commitment to the Guadalajara agreement equals Argentina's. On an official visit to Washington, Collor stated his government will "re-direct nuclear development away from the quest for a [nuclear] bomb."¹⁵¹ Not only is Brazil ending all nuclear weapons research, it is

¹⁴⁹ See Goldman, "U.S. Endorses Menem's Nuclear Plan's," 9, and "Argentina: No mass destruction weapons," Latin American Regional Reports: Brazil Report (RB-91-06, 8 August 1991), 8.

¹⁵⁰ "Menem Quayle Sign Agreements," (in Spanish), NOTICIAS ARGENTINAS, 6 August 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-152, 7 August 1991), 30. The agreement guarantees \$1.6 million in U.S. technological assistance. Despite the small amount of money, President Menem declared it "an extremely important action" because it involves "vital technology."

¹⁵¹ "Autonomous Technological Development," Latin American Regional Reports: Brazil Report (RB-91-06, 11 July 1991), 5.

curtailing its development of nuclear power reactors. Collor suspended the construction of Angra-II and Angra II reactors in July 1991. Financial difficulties continue to trouble Collor's administration and prevent the completion of these costly nuclear power plants.¹⁵²

President Collor strived to make the Brazilian nuclear program as "transparent" as possible.¹⁵³ Collor responded to the following question at the Guadalajara conference: "Can your government guarantee an end to nuclear weapons development?"

That is why I went personally, and with a shovelful of lime, I plugged the hole in the pipeline that was built [in Cachimbo] for atomic testing. I made the gesture so that everything would be relegated to the past. That was a different Brazil, a different world. Today there are new horizons. Brazil and Argentina have put an end to the nuclear arms race. The two countries with the most advanced nuclear technology in Latin America used to copy each other and confront each other. Today we are moving towards cooperation.¹⁵⁴

The ending of this historical rivalry is the most convincing reason to believe both nations will abandon nuclear weapons research. The primary reason to build an atomic weapon is to deter aggression by an adversary.

¹⁵² "Court Suspends Construction of Nuclear," (in Portuguese), O Globo, 18 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-140, 22 July 1991), 42.

¹⁵³ See Appendix D for excerpts from President Collor's address to the United Nations General Assembly on 23 September 1991.

¹⁵⁴ "Collor Views the NPT," (in Spanish), EXCELSIOR, 16 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-148, 1 August 1991), 32-38.

The end to Argentine-Brazilian bellicose rivalry removes the primary external threat to both nations.

B. WEAKNESSES OF THE GUADALAJARA ACCORD

The Guadalajara accord does not offer solutions to two major proliferation threats. The accord is flawed because it does not require full-scope safeguards by the IAEA and it allows the continued development of a nuclear submarine research.

1. Lack of Full-Scope Safeguards by the IAEA

The accord does not require full-scope IAEA safeguards because both Argentina and Brazil see any intrusive inspections to be a violation of national sovereignty. Argentina and Brazil discussed expanding the partial IAEA safeguards currently used at some nuclear facilities. In March 1991, in anticipation of the Ibero-American conference in Guadalajara, Argentina and Brazil began the process of negotiating a joint safeguards agreement with the IAEA. These negotiations are not for full-scope safeguards, but only for expanding the number of facilities under the existing safeguards agreement with the IAEA.¹⁵⁵

The IAEA negotiations are a long and detailed process. The Guadalajara agreement established an interim organization to verify that both nations follow a "common system of accounting and control of nuclear

¹⁵⁵ Joe Goldman, "U.S. Endorses Menem's Nuclear Plan's," The Bulletin of the Atomic Scientists (Volume 46, Number 6, July August 1990), 9-10.

materials." The bi-national agency is called the *Agencia Brasilenio-Argentina de Contabilidad y Control de Materiales Nucleares* (ABACC). This organization was first proposed by Presidents Raúl Alfonsín and José Sarney. In August 1991, Presidents Menem and Collor de Mello signed a protocol establishing diplomatic immunities for the ABACC to oversee nuclear activities in both countries.¹⁵⁶

The ABACC will not conduct intrusive inspections of nuclear facilities. The ABACC will only use accounting procedures to measure designated quantities of fissile material. This bilateral inspection organization is not as effective as IAEA. The IAEA can best ensure Argentine and Brazilian compliance with the NPT or Treaty of Tlatelolco. The United States should insist on "full-scope" IAEA safeguards before transferring dual-use technology (like the IBM supercomputer) to Argentina or Brazil.

Brazil and Argentina were scheduled to sign an IAEA safeguards agreement in Vienna, Austria, on 18 September 1991. The signing was delayed and the IAEA negotiations are likely to drag on. The Brazilian Congress continues to oppose any increase in IAEA

¹⁵⁶ "Collor assina acordo com Menem sobre arma química, [Collor Signs Agreement with Menem about Chemical Weapons]," (in Portuguese), FOLHA DE SÃO PAULO, 20 August 1991, translated and reported by INFO-SOUTH (13 September 1991).

inspections.¹⁵⁷ The legislature in Argentina also has reservations about increased IAEA inspections.¹⁵⁸

2. Development of a Nuclear Submarine

The Guadalajara Accord does not prevent the development of nuclear submarines. Nuclear submarine research is likely to continue in both nations (especially Brazil). The agreement states that:

Article II. Nothing in the provisions of this Accord shall affect the inalienable right of the Parties to carry out research, production and use of nuclear energy for peaceful purposes.

Article III. [Nothing will] restrict the use of nuclear energy for the propulsion or operation of any type of vehicle, including submarines.¹⁵⁹

Nuclear submarines provide the opportunity to divert nuclear materials to weapons programs and lend legitimacy to indigenous enrichment facilities. Once Argentina or Brazil acquired the ability to produce nuclear fuels for naval propulsion, the country would remain free to use the materials for nuclear weapons. Even the most intrusive inspections by the IAEA would be unable to ensure that weapons-grade material

¹⁵⁷ "Acordo mantem o 'segredo industrial'" [Agreement Maintains the "Industrial Secret"], (in Portuguese), GAZETA MERCANTIL, 30 July 1991, translated and reported by INFO-SOUTH (16 July 1991).

¹⁵⁸ "The Bomb, in Latin America," The New York Times (3 November 1991), E14.

¹⁵⁹ "Text of the Argentina-Brazil Nuclear Accord," (in Portuguese), GAZETA MERCANTIL, 30 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-167, 28 August 1991), 38.

produced for a submarine reactor was not being diverted for nuclear explosives.¹⁶⁰ Articles II and III of the Guadalajara Accord provide a loophole for nuclear weapons programs to continue in the future.

It is unlikely that either nation will build a nuclear submarine in the next decade because of existing financial problems. The Argentine Navy budget for 1991 cannot fund essential repairs on the only aircraft carrier (25 de Mayo) in its fleet. Argentina also postponed the construction of a TR-1700 diesel submarine. Brazil is more aggressive in its nuclear submarine research than Argentina. The Brazilian navy, however, has made the upgrading its shipboard anti-aircraft defenses a higher priority than the costly development of a nuclear submarine.¹⁶¹

Brazilian Foreign Minister Francisco Rezek disappointed the navy when he suggested Brazil would stop production of a nuclear submarine. Rezek identified concerns about U.S. technology transfers to be driving the discussion to shelve the nuclear submarine program. The Foreign Ministry believes that increased technology transfer is essential to Brazil's economic survival. Brazilian military leaders claim that any decision to halt production of the nuclear submarine would harm the

¹⁶⁰ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 63.

¹⁶¹ Robert L. Scheina, "Latin American Naval Review," Naval Institute Proceedings (Volume 117, March 1991), 88-94.

country's strategic designs by compromising its national sovereignty.¹⁶²

The Brazilian navy appears to have the political strength to ensure the continuation of the nuclear submarine project.

In acknowledging these problems, the Guadalajara Accord is still an important step in reducing the threat of nuclear proliferation in Latin America. It is successful because it reduces suspicions between Argentina and Brazil. It provides confidence-building measures and eliminates the rationale for building a nuclear weapon. The Guadalajara Accord is not a new or radical idea; rather, it is just the latest step in a process of nuclear rapprochement begun in 1985. Presidents Menem and Collor have concluded that nuclear rivalry between Argentina and Brazil proved to be a wasteful adventure for both nations. Popular sentiment in Argentina and Brazil appears to be decidedly anti-nuclear.¹⁶³ The populations in Argentina and Brazil are aware of the potential economic gains that result from improved relations, cooperation, and trade. The bellicose rivalry between these two nations has subsided. The hope for prosperity to return is alive.

The next chapter addresses U.S. nuclear non-proliferation policy asking the following questions: How should the United States respond to

¹⁶² "Exagerado otimismo [Exaggerated Optimism]," (in Portuguese), ESTADO DE SÃO PAULO, 14 June 1991, translated and reported by INFO-SOUTH (7 July 1991).

¹⁶³ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 40.

the "denuclearization" in Latin America? Should the United States allow increased technology transfers of advanced technology? Or, should the U.S. continue to hesitate to sell dual-use technology to Argentina and Brazil because of their refusal to complete the Treaty of Tlatelolco and the NPT?¹⁶⁴

¹⁶⁴ "O fulcro da questao [The Crux of the Question]," (in Portuguese), ESTADO DE SÃO PAULO, 11 August 1991, translated and reported by INFO-SOUTH (13 September 1991).

IX. IMPLICATIONS FOR UNITED STATES POLICY

U.S. non-proliferation policy is based upon the judgement that the spread of atomic weapons would result in new threats to American security. An increase in the number of nuclear weapons states could heighten global and regional instabilities, and raise the probability of nuclear weapons use. The non-proliferation efforts of the United States have followed three broad avenues:

- 1 - to reduce the political incentives that could lead a nation to decide to build a nuclear weapon;
- 2 - to make it technically more difficult to build a nuclear weapon through export controls and nuclear supply regimes;
- 3 - to encourage and strengthen international non-proliferation institutions (IAEA, Zangger, London Group).¹⁶⁵

The United States cannot prevent the development of nuclear weapons by withholding technology transfers. In 1945, the Manhattan Project did not have a "supercomputer" and it was able to build an atomic weapon. It is almost impossible to prevent a nation from building nuclear weapons, if it is willing to dedicate itself to their production. The technology to build atomic weapon is readily available. A successful non-proliferation policy tries to reduce the incentives for a nation to build an atomic bomb.

¹⁶⁵ Dunn, "Four Decades of Nuclear Non-Proliferation," in Aspen Strategy Group Report, New Threats, 233.

U.S. non-proliferation efforts in Latin America should target the motivations behind a decision to build a nuclear weapon. The reduced military tensions between Argentina and Brazil offer the U.S. an opportunity to help create a collective security arrangement eliminating their nuclear ambitions.

There is disagreement in the United States over how to best achieve its nuclear non-proliferation goals. There are two different schools of thought in the U.S. regarding nuclear proliferation in Latin America. The State Department and Commerce Department see the Guadalajara Accord as a solution to the nuclear proliferation problem. In this view, Argentina and Brazil deserve to be rewarded with increased trade, loans, and access to dual-use technology. The Commerce and State Departments endorse greater technology transfers because they strengthen U.S. competitiveness and increase exports.¹⁶⁶

The second school of thought resides in the Department of Defense (DOD), the Department of Energy (DOE), the Arms Control and Disarmament Agency (ACDA) and among many nuclear proliferation experts. This group has a more conservative interpretation of events in Argentina and Brazil. They oppose the transfer of dual-use technology such as the sale of an IBM 3090 computer to Brazil. They claim that increased

¹⁶⁶ Clyde H. Farnsworth, "A standoff with Brazil on computer," The New York Times (12 April 1991), C1.

access to dual-use technology may encourage the development of missiles and nuclear weapons in third world countries.¹⁶⁷ The Guadalajara agreement makes a promise, but the capabilities to produce nuclear weapons are still intact. This group believes that the establishment of full-scope IAEA safeguards is the best guarantee that future governments will not "reverse course and resume a nuclear weapons program."¹⁶⁸ The next sections examine these two schools of thought.

A. TIME TO REWARD A NON-PROLIFERATION SUCCESS

The best example of the differences between these two schools of thought is the controversial sale of an IBM supercomputer to Brazil. Brazil had been trying to import a supercomputer for several years to improve research and design at the Embraer plane factory. This technology transfer was slowed by various U.S. government agencies including the DOD, DOE, and ACDA. These agencies maintained that the computer could be used to design nuclear weapons. They barred the sale in the absence of assurances from Brazil that the computer would not be used for military purposes.¹⁶⁹ The U.S. State and Commerce Departments wanted to expedite this sale. President Bush announced approval of the sale prior to his six-day tour of

¹⁶⁷ Farnsworth, "A standoff with Brazil on computer," C1.

¹⁶⁸ "The Bomb, in Latin America," The New York Times (3 November 1991), A19.

¹⁶⁹ Brian Robinson, "IBM 3090 going to Brazil," Electronic Engineering Times (Number 620, 10 December 1990), 14.

South America intended to promote the idea of a free trade zone between North and South America.

Despite the sale approval in late November 1990, the shipment of the IBM supercomputer is delayed because Brazil has failed to provide the required guarantees that the computer will not be used for military purposes or be transferred to another country.¹⁷⁰ H. Ross Perot stated:

...[that such a] computer could have been used for nuclear weapons' development and that both the Commerce and State Departments had continued to encourage the sale of the computer until it was finally blocked by the Central Intelligence Agency and Department of Defense.¹⁷¹

The State Department's support for technology transfers to Latin America has increased because of the recent steps taken in Argentina and Brazil to end nuclear weapons research. The State Department believes strongly in the need to increase U.S. technology transfers to the region.¹⁷² The problem of nuclear proliferation in Latin America appears to be resolved; only the formalities need to be completed. The issue of nuclear

¹⁷⁰ "Lack of Guarantees holds up delivery of U.S. Supercomputer," Latin American Regional Reports: Brazil Report (RB-91-04, 2 May 1991), 8.

¹⁷¹ John McCormick, "When was U.S. shipping supercomputers to Hussein?" (Larry King Show guest H. Ross Perot questions US trade policy in Persian Gulf), The Larry King Show (Television program on 14 January 1991).

¹⁷² "Autonomous Technological Development," Latin American Regional Reports: Brazil Report (RB-91-06, 11 July 1991), 5.

proliferation is moot because there is no reason for Argentina or Brazil to build nuclear weapons.¹⁷³

It is likely that Argentina and Brazil will comply fully with the Treaty of Tlatelolco (possibly during 1992). The reduced military tensions between Argentina and Brazil have eliminated a primary reason for either nation to build nuclear weapons. Therefore, it is time to reward the Guadalajara Accord as a non-proliferation success. The U.S. should offer debt relief and expand economic relations with Argentina and Brazil.

The rewards from the United States government will be an increase in trade, loans, and investment. Vice President Quayle's recent visit to Argentina and Brazil is an example of U.S. efforts to reward non-proliferation progress in Latin America. Another compensation might be the debt restructuring benefits of the Brady Plan. President Menem hopes that Argentina's admission to the Brady Plan will be discussed during his visit to the United States in November 1991.¹⁷⁴

¹⁷³ A brief explanation of the U.S. State Department's position on technology transfers to Latin America can be found in "Lack of Guarantees holds up delivery of U.S. Supercomputer," Latin American Regional Reports: Brazil Report (RB-91-04, 2 May 1991), 8.

¹⁷⁴ "Menem Discusses IMF Talks, Trip to U.S.," (in Spanish), TELAM, 18 September 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-182, 19 September 1991), 16.

B. APPLAUD THE PROGRESS, BUT PRESS FOR FULL-SCOPE SAFEGUARDS

In general, proliferation experts are cautious about announcements that nuclear issues are "moot." The nuclear facilities and technical knowledge capable of building nuclear weapons will remain in Argentina and Brazil. The influx of nuclear specialists from the Soviet Union may even improve either nation's ability to produce a nuclear weapon. William Potter has described the potential proliferation danger of Soviet scientists becoming "nuclear mercenaries." The economic crisis in the Soviet Union and the declining status of many state-employed scientists may cause an increase in the emigration of nuclear specialists. Estimates on the number of Soviets with nuclear experience range from 5,000 to over 100,000 persons.¹⁷⁵

The fear of a potential oil shortage during the Gulf War convinced Brazil of the need to expand its nuclear energy program. Brazil is seeking to attract thousands of Soviet scientists to the country.¹⁷⁶ Brazilian Secretary of Science and Technology José Goldemberg confirmed that Brazil wants to attract university-trained Soviet technicians interested in leaving

¹⁷⁵ William C. Potter, presentation on the "The Proliferation Threats and Nonproliferation Opportunities in a De-Centralized Soviet Union" on 19 November 1991 at the Monterey Institute of International Studies (MIIS), Monterey, CA.

¹⁷⁶ "Efforts Under Way To Attract Soviet Scientists," (in Portuguese), O Globo, 9 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-151, 6 August 1991), 18.

the Soviet Union. Mr. Goldemberg, a nuclear physicist and strong advocate of expanding Brazil's nuclear energy capability, stated that their employment would be financed for at least two years.¹⁷⁷ The potential that such scientific expertise could be used for military purposes cannot be ignored.

Argentina and Brazil may not fulfill the promises made in the Guadalajara Accord. Joseph F. Pilat and Robert E. Pendley maintain that the U.S. foreign policy should recognize the possibility that nuclear weapons research may continue in Argentina and Brazil. The ongoing proliferation threats in Argentina and Brazil must be considered. Below is a list of possible factors that would lead Argentina and Brazil to continue the pursuit of nuclear weapons:

1. The rise of nationalistic political parties in Argentina and/or Brazil that see non-proliferation pressures by the United States as a vestige of colonialism. A nationalist movement may reject IAEA inspections because they represent a tool of "atomic apartheid" or "nuclear colonialism."¹⁷⁸
2. The return of the military to power through a coup, allowing the armed forces to pursue nuclear weapons, either overtly or covertly.
3. The collapse of the NPT in 1995 or weakening of the IAEA, increasing the incentives to build nuclear weapons. If the number of nuclear

¹⁷⁷ "Project Confirmed," (in Portuguese), O Globo, 9 July 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-151, 6 August 1991), 19.

¹⁷⁸ Pilat and Pendley, Beyond 1995: The Future of the NPT Regime, 161.

powers increases around the globe, then Argentina and Brazil might renew nuclear weapons development.

4. The return of high levels of economic growth and prosperity, allowing investment of excess capital in the nuclear sector.

C. POLICY RECOMMENDATIONS

The United States appears to have a credibility problem in the area of non-proliferation policy.¹⁷⁹ The U.S. has a record of uncertain and ambivalent non-proliferation leadership. Pakistan, India, and South Africa were all denied U.S. military aid and nuclear exports at one time. Later, a reversal in U.S. policy encouraged transfers of military hardware and nuclear fuel to these countries. The U.S. needs to adopt a high profile, public commitment to nuclear non-proliferation to reinforce the behind-the-scenes U.S. diplomacy in foreign capitals.¹⁸⁰ The nuclear non-proliferation policies of the United States could be improved by the following three recommendations.

First, the U.S. must complement its global policies (export controls and regime-building) with regional and country-specific policies. U.S. non-proliferation policy should be organized around three principles: prevention, containment, and management on a nation-by-nation basis.¹⁸¹ Given the

¹⁷⁹ Pilat and Pendley, Beyond 1995: The Future of the NPT Regime, 159.

¹⁸⁰ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 63.

¹⁸¹ Spector, "Nuclear Proliferation in the 1990s: The Storm After the Lull," in Aspen Strategy Group Report, New Threats, 63.

magnitude and diversity of the problem of nuclear proliferation, specifically tailored initiatives are needed to address the nuclear ambitions of Argentina and Brazil. The U.S. should not repeat the policy reversals that occurred with respect to Pakistan, India, and South Africa. The U.S. should be firm in its insistence on full-scope IAEA safeguards in Argentina and Brazil.

Second, the inherent limits of unilateral U.S. action must be acknowledged and overcome through multilateral efforts. The U.S. should encourage greater European and Japanese cooperation in preventing proliferation, especially in terms of tighter export controls. The end of the cold war brings opportunities to coordinate the nuclear non-proliferation policies in the U.S. and former Soviet Union.

The coordination U.S. and Soviet non-proliferation efforts might encourage an end to many nascent nuclear weapons programs around the world. William Potter called this a "window of opportunity" where the successor states of the U.S.S.R. may be encouraged to take steps to strengthen the NPT, MTCR, IAEA and other international non-proliferation regimes.¹⁸²

Third, the United States should adopt policies to strengthen the IAEA. The IAEA performs a critical role in the nuclear non-proliferation regime. There is a pressing need to review, update, and expand the IAEA

¹⁸² William C. Potter in a presentation at Monterey Institute of International Studies (MIIS) on 22 October 1991 in Monterey, California.

capabilities. The disclosures that Iraq's nuclear weapons efforts escaped IAEA safeguards shows the need for the IAEA to adopt random inspections. The U.S. must work to insure the IAEA remains a "depoliticized" agency with strong international support, both financial and diplomatic. A research and development program for the new verification methods should receive increased funding. It is important to improve the technologies and procedures to monitor nuclear proliferation.

D. CONCLUSION

The reduction of technology transfers to the Southern Cone would not guarantee the end of nuclear weapons research, but it might sour relations between the United States and Argentina and Brazil. Technology transfers are positive foreign policy tools because they often foster greater cooperation. Therefore, Argentine and Brazilian access to U.S. technology should be increased, but not increased blindly. The U.S. should link access to dual-use technology with the acceptance of IAEA full-scope safeguards by Argentina and Brazil.

The Guadalajara Accord offers hope that nuclear proliferation in Latin America can at least be slowed and perhaps stopped. The establishment of civilian control over the military and the reduction in the belligerent rivalry between Argentina and Brazil are central factors in ending the quest for nuclear weapons. The firm commitment of the civilian

leadership in Argentina and Brazil to pursue only peaceful nuclear activities is a positive sign. The adoption of IAEA full-scope safeguards in Argentina and Brazil will be the best guarantee for a nuclear weapons-free Latin America.

APPENDIX A

THE RIGHT OF THE UNITED STATES TO TRANSPORT NUCLEAR WEAPONS IN AND THROUGH TERRITORIES WITHIN THE ZONE OF APPLICATION OF THE TREATY OF TLATELOLCO

The United States insisted on the following interpretation of the transit rights under the Treaty of Tlatelolco:

The proposed treaty should impose no prohibition that would restrict the freedom of transit [of nuclear weapons] within the Western Hemisphere. The U.S. policy on the freedom of transit is based on our national security needs and the vital security needs of the Hemisphere.¹⁸³

The United States faced considerable opposition on the transit issue. Mexico stated that this interpretation undermined the entire purpose of the treaty. However, the firm U.S. position ensured that the final compromise allowed each nation in Latin America the "discretion" to permit the transit of atomic materials through its territory. The U.S. policy of "neither confirming nor denying" the presence of nuclear weapons on any of its ships or aircraft traveling through Latin America has continued. Some opposition to U.S. Navy ship visits exists in Latin America, but, it has been far less vocal than in other parts of the world. There has not been any confrontation in Latin America comparable to New Zealand's 1985 decision to refuse ship visits by nuclear-capable or nuclear-powered ships.¹⁸⁴

¹⁸³ U.S. Senate, Committee on Foreign Relations, Additional Protocol I To The Treaty For The Prohibition Of Nuclear Weapons In Latin America (95th Congress, 2nd Session, 15 August 1978), 47.

¹⁸⁴ Jacob Bercovitch, ANZUS in Crisis: Alliance Management in International Affairs (New York: St. Martin Press, 1988), 1-29.

APPENDIX B

ARGENTINA - GOVERNMENT

Type of Government	Federal Republic
Government Leaders	PRESIDENT Carlos Saúl MENEM (1989) VICE PRESIDENT Eduardo DUHALDE (1989)
Major Parties	Radical Civic Union (UCR) Justicialist Party (JP) Intransigent Party (PI) Union of the Democratic Center (UCEDE)

ARGENTINA - GENERAL PROFILE

Area	1,068,297 sq mi
Population 1989	31,914,000
Population Growth	1.2 %
Population Density	30 /sq mi
GNP 1989 (millions)	\$84,701
GNP per Capita	\$2,654
Capital City	BUENOS AIRES
Size of Military	95,000

ARGENTINA - DEMOGRAPHICS

Population 1991	32,685,000
Population 2000	36,389,000
Population Growth	1.2 %
Population Density	30 /sq mi
Pop'n Doubling Time	58 years
Urbanization	84.7 %

ARGENTINA - GROSS NATIONAL PRODUCT (GNP)

GNP 1990 (millions)	\$86,395
Annual GNP Growth	2.0 %
GNP per Capita	\$2,654
%GNP for Agriculture	15 %
%GNP for Industry	35 %
%GNP for Services	50 %
%GNP for Defense	1.4 %

Source: PC Globe, Inc. Tempe, AZ, 1990.

APPENDIX C

BRAZIL - GOVERNMENT

Type of Government	Federal Republic
Government Leaders	PRESIDENT Fernando COLLOR de Mello(1990) VICE PRESIDENT Itamar FRANCO (1990)
Major Parties	Brazil Democratic Movement Party (PMDB) Liberal Front Party (PFL) Workers Party (PT) Brazilian Labor Party (PTB) Democratic Workers Party (PDT)

BRAZIL - GENERAL PROFILE

Area	3,286,473 sq mi
Population 1989	150,750,000
Population Growth	2.0 %
Population Density	46 /sq mi
GNP 1989 (millions)	\$338,397
GNP per Capita	\$2,245
Capital City	BRASILIA
Size of Military	320,000

BRAZIL - DEMOGRAPHICS

Population 1991	156,840,000
Population 2000	187,439,000
Population Growth	2.0 %
Population Density	46 /sq mi
Pop'n Doubling Time	35 years
Urbanization	73.8 %

BRAZIL - GROSS NATIONAL PRODUCT (GNP)

GNP 1990 (millions)	\$348,210
Annual GNP Growth	2.9 %
GNP per Capita	\$2,245
%GNP for Agriculture	9 %
%GNP for Industry	36 %
%GNP for Services	55 %
%GNP for Defense	0.8 %

Source: PC Globe, Inc. Tempe, AZ, 1990.

APPENDIX D

President Collor addressed the United Nations General Assembly on 23 September 1991 with the following statement regarding Brazil's nuclear rapprochement with Argentina:

On 18 July 1991, in Guadalajara, Mexico, we, Brazil and Argentina, signed an agreement on the peaceful use of nuclear energy. This agreement has great historical significance for our countries and represents evidence that it is possible to achieve nuclear security through nuclear cooperation.

The safeguard agreement that, we, Brazil and Argentina, will sign with the International Atomic Energy Agency will supply all information necessary to verify our commitment to the peaceful use of nuclear energy and will preserve the technological achievements in the mastery of the atomic cycle that we arduously reached.

Furthermore, a month ago we signed the Mendoza Agreement with Argentina and Chile, formalizing our mutual rejection of chemical and biological weapons.

Brazil understands the aforementioned agreements comprise a full and sufficient guarantee of the peaceful purposes of our nuclear program and our repudiation of weapons of mass destruction.

...We must find formulas to reconcile two basic interests: preventing the dissemination of technology for production of weapons of mass destruction and keeping open the channels to obtain these technologies for peaceful uses.¹⁸⁵

¹⁸⁵ "Collor Addresses U.N. General Assembly," (in Portuguese), Rio de Janeiro Rede Globo Television, 23 September 1991, translated and reported in Foreign Broadcast Information Service (FBIS-LAT-91-185, 24 September 1991), 15-18.

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